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Premier of South Australia 1901-5; Agent-General in London for South Australia

KEY TO PRONUNCIATION.

ā	far, father	ñ	Span. ñ, as in <i>cañon</i> (căn'yôn), <i>piñon</i> (pên'yôn)
â	fate, hate	ng	mingle, singing
a or ă	at, fat	nk	bank, ink
ā	air, care	ō	no, open
ā	ado, sofa	o or ō	not, on
â	all, fall	ô	corn, nor
ch	choose, church	ó	atom, symbol
ē	eel, we	o	book, look
e or ě	bed, end	oi	oil, soil; also Ger. <i>eu</i> , as in <i>beutel</i>
é	her, over; also Fr. <i>e</i> , as in <i>de</i> ; <i>eu</i> , as in <i>neuf</i> ; and <i>œu</i> , as in <i>boeuf</i> , <i>cœur</i> ; Ger. <i>ö</i> (or <i>oe</i>), as in <i>ökonomie</i> .	ō or oo	fool, rule
ę	befall, elope	ou or ow	allow, bowsprit
ē	agent, trident	s	satisfy, sauce
ff	off, trough	sh	show, sure
g	gas, get	th	thick, thin
gw	anguish, guava	fh	father, thither
h	hat, hot	ū	mute, use
h or H	Ger. <i>ch</i> , as in <i>nicht</i> , <i>wacht</i>	u or ũ	but, us
hw	what	û	pull, put
i	file, ice	ü	between u and e, as in Fr. <i>sur</i> , Ger. <i>Müller</i>
i or I	him, it	v	of, very
ï	between e and i, mostly in Oriental final syllables, as, Ferid-ud-din	y	(consonantal) yes, young
j	gem, genius	z	pleasant, rose
kw	quaint, quite	zh	azure, pleasure
ñ	Fr. nasal <i>m</i> or <i>n</i> , as in <i>embonpoint</i> , <i>Jean</i> , <i>temps</i>	'	(prime), " (secondary) accents, to indicate syllabic stress

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10. CROWN AND CABINET.....	Clerk of the House of Commons, formerly Legal Member of the Viceroy's Council in India EDWARD JENKS
11. THE JUDICIAL SYSTEM.....	Fellow of King's College, Cambridge; Principal and Director of Legal Studies of the Law Society WILLIAM BLAKE ODGERS
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15. IRISH HISTORY.....	Professor of Ancient (Scottish) History and Palæography, University of Edinburgh THE REV. T. A. FINLAY
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41. THE BRITISH TARIFF MOVEMENT.....	J. L. GARVIN
	Editor of 'The Outlook'; author of 'Economics of Empire'
42. THE REACTION OF BRITISH IMPERIALISM ON THE MOTHER COUNTRY.....	J. L. GARVIN

GREAT BRITAIN:

HISTORY AND MODERN DEVELOPMENT.

INTRODUCTORY.

The following series of articles, dealing with various aspects of the life of the United Kingdom, is intended to present a coherent account of present British conditions and activities, and of the historical circumstances which have led up to them. On a balance of considerations the usual encyclopædic arrangement in alphabetical order has been abandoned. Encyclopædias are used by two classes of people—for reference by those who have access to other books, for reading by those who must live in the main removed from books. For purposes of reference there is no doubt much to be said for the alphabetical order of arrangement. But knowledge is organic; no fact can be understood in isolation, or fully understood apart from the general scheme and atmosphere of the department of knowledge to which it belongs. Even for reference it is therefore likely that matter grouped according to some natural order, if supplemented by an alphabetical index, will convey the truer impression. For continuous reading there can of course be no question of the superiority of such an order.

The characteristic of British Institutions is that it is impossible to understand them apart from their history. They rarely have logical consistency, for the English suspect ideas, notwithstanding the fact that in certain departments the world owes great ideas to some Englishmen. The typical Englishman suspects an idea because he is impressed with the complexity of experience. He is a creature of habit, not so much from inertia as from caution. His political wisdom does not express itself in such phrases as "Liberty, Equality, and Fraternity," but in practical and limited expressions such as "Freedom of Speech," or "Freedom from Arrest," and in such working laws as that "the remedy of grievances must precede supply." He is willing to change his habits, but only when they have become inconvenient to him because of changed conditions.

The British constitution has never been reduced to writing. It is matter of habit, and throughout history has been in a state of flux. Thus the English manage to combine a curious conservatism with a way of advancing in some matters ahead of the rest of mankind. They have little feeling for symmetry, and are not hurt by anomalies, hence their practical sense of compromise, and their trust in the curative power of time. Though the least consciously historical of all the great races, their institutions are only explicable with the aid of history. Therefore the aim set before the contributors to the British section of this Encyclopædia has been to sketch the leading characteristics of the

British nation, and so to sketch them that they are seen to be the natural outcome of history.

The fifty-five articles which follow fall into eight groups. First we have a group concerned with the Making of England, the senior and predominant partner in the United Kingdom. Here the history of Britain, and especially of England, is told with a definite object. There are some episodes and some aspects of history which have chiefly an archaeological value. Their results no less than their causes are past. But there are others whose results have endured, and are embodied in the features of to-day. Bagehot somewhere compared the different standpoints in history to the different grouping of the monuments of the same city when seen from two different towers. The perspective of these articles is that of the social and economic observer of to-day, who seeks to explain the present in the light of the past rather than the past in the light of the present. We have nine articles in the first group, viz.:-

A.—THE MAKING OF ENGLAND.

2. GEOGRAPHICAL ENVIRONMENT THE EDITOR.
3. THE CONQUESTS.....DR. THOMAS HODGKIN.
4. MEDIAEVAL ENGLAND.....PROF. T. F. TOUT.
5. THE REFORMATION.....PROF. A. F. POLLARD.
6. THE XVIIth CENTURY.....DR. WILLIAM A. SHAW.
7. THE XVIIIth CENTURY:
 - (a) POLITICAL SKETCH.....DR. LILIAN KNOWLES.
 - (b) THE FRENCH WARS... DR. J. HOLLAND ROSE.
8. THE XIXth CENTURY:
 - (a) POLITICAL SKETCH.....DR. J. HOLLAND ROSE.
 - (b) POLITICAL PARTIES.....SIR THOMAS RALEIGH.

In the second group we have a description of the Mechanism of British Government, both Central and Local. Historical considerations have not been, and indeed could not be wholly excluded, but the aim of the articles in this group is to explain the system, so far as there is a system, and the habits of British Government. The point which will probably strike an American as characteristic of the whole machine is its centralization. The sharp distinction and counterbalance of legislative, executive, and judicial functions, and of local and central powers, are unknown. So far as natural laws and the prejudices begotten of history permit, Parliament is omnipotent. Within Parliament the House of Commons, and within the Commons the Cabinet, and within the Cabinet the Prime Minister count for more than any other force.* It is within the power of no court of law to declare that Parliament has acted *ultra vires*, and the local authorities have no rights which cannot be overridden by Act of Parliament. In this second group we have five articles:

* This statement is not invalidated by the fact that some members of the Cabinet, and sometimes even the Prime Minister, are chosen from the House of Lords.

GREAT BRITAIN — INTRODUCTORY

B.—THE MECHANISM OF GOVERNMENT.

9. PARLIAMENT.....SIR COURTENAY ILBERT.
10. CROWN AND CABINET..PROF. EDWARD JENKS.
11. THE JUDICIAL SYSTEM DR. WM. BLAKE ODGERS, K. C.
12. LOCAL GOVERNMENT..SIDNEY AND BEATRICE WEBB.
13. THE CIVIL SERVICE..MR. GRAHAM WALLAS.

Then there follows a small group of articles dealing with the peculiarities of the three Junior Partners in the United Kingdom. Scotland was a Centralized Monarchy, long allied with France in hostility to England. She retains her own law and churches, but similarity of race and of resources have permitted of her blending with England into a single economic organism. Ireland has never been a single independent state, yet geographical, religious, and economic causes have always held her apart from England, notwithstanding the strategical necessity which has prevented and prevents her separation. Wales has had even less of national history than Ireland, yet the Welsh race has maintained a separate vitality, although expressed rather in literary than political institutions. There is perhaps no greater political anomaly in the world than the peculiarly illogical — characteristically British — relations of the four nationalities which form the United Kingdom. The articles of this third group are as follows:

C.—THE JUNIOR PARTNERS.

14. SCOTLAND.....PROF. P. HUME BROWN.
15. IRELAND.....THE REV. T. A. FINLAY.
16. WALES.....PROF. EDWARD ANWYL.

From political government we turn in the next group of articles to the Control and Movement of the National Wealth. The banker and the merchant, the ship-owner and the railway chairman compete in these days with the political statesman for the control of humanity. In this department also of the national life of Britain centralization is characteristic. English banking and railway management are centralized in London, and in a less degree the same is true also of British shipping and commerce. Though some banks and railways and many shipping companies have their head offices outside the Metropolis, yet the banking and railway clearing houses, and Lloyds, the chief seat of shipping insurance, are within it. Even the Scottish and Irish banks depend ultimately on the gold reserve of the Bank of England. Britain, in other words, is a single compact organism with a metropolitan nucleus containing one-sixth of its population. No other important centre is at a greater distance than can be traversed by an express train between the morning and the evening meal. Thus it comes about that a relatively small group of leaders, known either directly or indirectly to one another, go near to controlling all departments of the national life. In other words, Britain is essentially an oligarchy limited by democracy. This fourth group consists of seven articles:

D.—THE CONTROL AND MOVEMENT OF WEALTH.

17. NATIONAL FINANCE.....DR. EDWIN CANNAN.
18. BANKING AND CURRENCY..SIR FELIX SCHUSTER AND MR. ERNEST SYKES.
19. COMMERCE:
 - (a) XVIIIth CENTURY...DR. LILIAN KNOWLES.
 - (b) PRESENT DAY.....MR. A. J. SARGENT.
20. SHIPPING:
 - (a) NAVIGATION ACTS...DR. LILIAN KNOWLES.
 - (b) PRESENT DAY.....MR. RUSSELL REA, M. P.
21. RAILWAYS.....MR. W. M. ACWORTH.

We then turn to the fifth group which deals with the Production of British Wealth. Here necessarily there is greater decentralization for we come closer to the soil, the mines, and the coasts. The great staple industries of Britain are away from the Metropolis, and in the industrial districts we find a new social and intellectual atmosphere. The three minor nationalities and the Industrial North of England are the democratic forces which compete with the agricultural, commercial, and administrative oligarchy in London. The articles of this group are:

E.—THE PRODUCTION OF WEALTH.

22. AGRICULTURE:
 - (a) THE LAND LAWS.....MR. J. FISCHER WILLIAMS.
 - (b) XVIIIth CENTURY....DR. LILIAN KNOWLES.
 - (c) XIXth CENTURY.....MR. A. D. HALL.
23. FISHERIES.....SIR HERBERT MAXWELL.
24. MINING.....PROF. R. A. S. REDMAYNE.
25. INDUSTRIES:
 - (a) INDUSTRIAL REVOLUTION DR. LILIAN KNOWLES.
 - (b) EXISTING INDUSTRIES..MR. W. A. S. HEWINS.

The institutions discussed in the next, the sixth group, are chiefly products of northern industrial thought. The trade unions and the industrial co-operative societies have originated in the north, and have there reached their most efficient and general development. From that region, also, has come the stimulus for factory legislation. The articles in the sixth group are as follows:

F.—INDUSTRIAL RE-ORGANIZATION.

26. TRADE UNIONISM.....SIDNEY AND BEATRICE WEBB.
27. THE LABOR POLITICAL MOVEMENT.....MR. E. R. PEASE.
28. CO-OPERATION.....MR. H. W. MACROSTY.
29. FACTORY LEGISLATION..SIDNEY AND BEATRICE WEBB.

The articles in these six groups have dealt with political and economic power. In the seventh group we turn to what may be described as the ideal life of the nation — its religion, its education, and its amusements. But even here one cannot help being struck by the essential unity of English life. The churches and society are intimately concerned with politics. No large interest in Britain holds aloof from government. The typical English education aims at the shaping of character for political and commercial activities rather than at intellectual training for the achievements of scholarship. The articles of the seventh group are:

G.—THE IDEAL LIFE OF THE NATION.

30. RELIGION:
 - (a) THE CHURCH OF ENGLAND.....DR. A. C. HEADLAM.
 - (b) NONCONFORMITY...THE REV. DR. JOHN BROWN.
 - (c) ROMAN CATHOLICISM MONSIGNOR BERNARD WARD.
 - (d) JUDAISM.....MR. ISRAEL ABRAHAMS.
31. EDUCATION:
 - (a) GENERAL.....MR. GRAHAM BALFOUR.
 - (b) MEDICAL.....DR. FRANCIS FREMANTLE.
 - (c) ENGINEERING.....PROF. D. S. CAPPER.
32. SOCIETY.....THE HON. MRS. ALFRED LYTTLTON.
33. SPORT.....THE RIGHT HON. ALFRED LYTTLTON, K. C., M. P.
34. THE FINE ARTS.....MR. A. J. FINBERG.
35. NEWSPAPERS.....MR. J. A. SPENDER.
36. THE TREND OF THOUGHT AND LITERATURE IN THE XIXth CENTURY.....DR. SIDNEY LEE.

GREAT BRITAIN—GEOGRAPHICAL ENVIRONMENT

Finally, we have an eighth group of articles dealing with the external expression of British life. Here we find the same forces in action—the dominant imperialism of London, with its great tradition of statesmanship, limited by the partially antagonistic ideals of the industrial and democratic north. The eighth group of articles is as follows:

H.—EXTERNAL RELATIONS.

- 37. NAVY..... LIEUT. CARLYON BELLAIRES,
R. N., M. P.
- 38. ARMY..... THE RIGHT HON. H. O.
ARNOLD-FORSTER, M. P.
- 39. FOREIGN POLICY:
 (a) IN RELATION TO
 EUROPE..... THE HON. GEORGE PERL.
 (b) IN RELATION TO
 INDIA..... SIR WALTER LAWRENCE.
- 40. THE FREE TRADE MOVE-
 MENT..... MR. J. ST. JOE STRACKEY
- 41. THE TARIFF REFORM MOVE-
 MENT..... MR. J. L. GARVIN.
- 42. THE REACTION OF THE EM-
 PIRE ON THE MOTHER
 COUNTRY..... MR. J. L. GARVIN.

The writers of the articles in these eight groups are authorities on their respective subjects. They all speak either from long study or long practical experience, and I desire to thank them for the pains they have taken with the object of presenting as complete a picture of the political, social, and economic condition of the Old Country as space would permit of. The intention of each has been to convey the key ideas and not merely the statistics of the department entrusted to him. Bibliographies have been appended throughout, as a guide to readers who would pursue further particular studies in which they are interested. In these days when libraries are multiplying throughout the Anglo-Saxon world, the function of an Encyclopædia should not only be to reply to the questions which arise incidentally to study and business, but also to act as a guide to the leading sources of information which we may reasonably expect to find on the shelves of a good library.

H. J. MACKINDER.

THE MAKING OF ENGLAND.

2. Great Britain—Geographical Environment. The Greeks could not have played their decisive rôle in history had they not dwelt in the centre of the lands, amid the islands and peninsulas between Europe and Asia. Nor is it likely that any race less happily endowed could have achieved what the Greeks achieved even in that favored environment. A like relation is true as between the British race and the British Isles.

The origins of the British race are recounted in the next article of this volume. It is the aim of the present article to analyse the geographical influences which have contributed to British history.

Popular philosophy, as embodied in Shakespearean phrases such as the "moat defensive" and the "silver streak," would dismiss the matter as almost too simple and obvious for set discussion. The insularity of Britain has no doubt counted for more than any other single geographical cause, but the British polity and character are in fact the product of a very singular combination of geographical no less than historical circumstances. For the purposes of this short summary the major geographical controls of British development may be grouped under the nine following heads:

1. Insularity.
2. Shallow surrounding seas.
3. Neighborhood to the continent.
4. Relation to the chief linguistic frontier of Europe.
5. Climate determined by oceanic winds.
6. Internal natural divisions.
7. Adequacy of economic bases.
8. Geographical momentum.
9. The consequences of sea power.

1. *Insularity.*—Britain has not been successfully invaded since the defeat at Hastings eight and a half centuries ago. The Englishman is ever conscious of this fact—it is a frequent argument in twentieth century political speeches. The victories over the Spanish Armada and at

Trafalgar have served to increase the sense of security, and freedom at home and empire abroad are the twin results. At home there has been an ineradicable jealousy of a standing army, and there has therefore been freedom for the development of what Bagehot described as "government by talk." The navy on the other hand has at most times been viewed with favor, for it has screened the experiment; and mistakes by which popular government has been slowly nurtured. These mistakes were often such as would have involved a continental nation in the consequences of a Jena or a Sedan.

Insularity has also permitted of a concentration of purpose upon the sea which was impossible for the other maritime states along the western seaboard of Europe. England succeeded where Portugal, Spain, France, and Holland failed, because, in the absence of a land frontier, her economic resources could be focussed on adventure beyond the seas. In this regard it must be borne in mind that sea-power does not rest on the navy alone, but on the co-operation of a mobile army with a dominant navy. An army limited to this subsidiary use has been possible for Britain because of her insularity. By her navy and amphibious army Britain won North America and the sovereignty of the Indies, while France and Holland were involved in continental wars. It was by the exhaustion of her enemies rather than by her victories that Britain achieved her empire. This is surely the truth which lies behind Seeley's famous utterance "that Britain made an empire in a fit of absence of mind." Behind her girdle of seas she fought with a limited liability and was immune at home though often defeated abroad.

John Bull's insularity of character is the natural result of his strong frontier. Elsewhere the types of humanity merge gradually where political frontiers are crossed. In some respects this contrast between the British and the continental peoples was in the past even more ob-



GEORGE V,
KING OF ENGLAND.

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vicious than to-day. Not only, on the one hand, is the traffic over the seas more frequent now, and Britain's isolation in time of peace less marked, but on the other hand, the change at the conventional continental frontier has been emphasized owing to the centralized character of the modern great state. It is the stalwart Prussian Protestant who does duty now-a-days on the frontier of Alsace-Lorraine, not the Swabian, shorter, darker, and Catholic neighbor of the Frenchman across the line. Ever since the days of the first Edward, the Englishman has felt himself a foreigner from the moment that he landed at Calais or Boulogne.

2. *Shallow Surrounding Seas.*—The British Isles are the emergent portions of a great shoal known as the Continental Shelf, which stands out seaward from the mainland coast. Precisely as waves grow taller until they break on the foreshore, so the tides, which measure in mid-ocean only some two or three feet in amplitude, are magnified several fold as they pass on to the British shoal. Strong currents are thus generated as the wide British seas alternately deepen and drain low. Caesar bore eloquent testimony to the influence of our tidal currents in the defeat of his strategy. The British tides, however, have had a uniting as well as a disuniting influence. Streams and streamlets whose mouths in other parts of the world would be mere creeks without fame, in these seas bear the historic names of Thames and Severn, Rhine and Seine. Even in the days of steam motive power, the flow and ebb of the Thames to and past London are worth much money annually—a fact which is one of the chief arguments against the scheme often proposed for erecting a dam below the metropolis and so keeping the water permanently high. What the tides were in the days before steam is evident from the position, many miles from the open sea, of such ports as London, Antwerp, and Hamburg.

Nor must it be forgotten that the shallow seas around Britain are exceptionally productive of fish. The fishermen of Holland became the carriers from Lisbon to the Baltic, and when Lisbon fell temporarily under the power of Spain, these same Dutchmen extended their voyages to the Indies. To-day, however, the fishermen of England and Scotland are in a great majority on the international fishing grounds of the North Sea, and the powerful steam fishing vessels which are now being built extend their operations as far as Iceland on the one hand and the coast of Morocco on the other. It is an important fact for a state whose power is on the sea that there are no fewer than one hundred thousand English, Scotch, and Irish who earn their living wholly or in part by sea fishing.

3. *Neighborhood to the Continent.*—Britain would have had small significance in the world had her position been distant from the historic shores of Europe. It is of course true that the ancient writers from Virgil to Shakespeare are full of the remoteness of Britain at the end of the known world. It is true also that until a relatively late period in history Britain did not count among the powers which shaped the destiny of mankind. These very facts however have enabled Britain to play a part in the last

two or three centuries which is comparable to that played by the Greeks on the smaller stage of the earlier time. Because of her neighborhood to Europe, Britain was deeply and repeatedly influenced from several distinct quarters, yet because of her insularity was never permanently attached to any one centre of European culture. It has been Britain's function to amalgamate the several elements of European civilization, and then to spread Europe to all the shores of the world. At least four streams of blood—Neolithic, Celtic, Roman, and Teutonic—and four linguistic influences, all drawn from across the narrow seas, have gone to the making of modern Britain. Yet the Englishman of to-day differs generically from all the species of continental European. Britain has been and is of Europe yet not in Europe.

From this point of view it is important also to notice that the hilly parts of the British Isles are in the north and the west—toward the ocean that is to say, not toward the continent. As a result, the agricultural England of the plain, the dominant partner in the United Kingdom, lies toward the channel, and London is close neighbor to Paris and the Netherlands. History would have been far other than it has been had the hills been in the south-east and the plains in the north and west.

4. *Relation to the Chief Linguistic Frontier of Europe.*—A glance at a map of Europe showing the areas occupied by the several languages would make it clear that the most important linguistic frontier, that between the Romance and Teutonic tongues, traverses Europe diagonally from the Alps, and comes down to the coast in the northern corner of France, within sight of Dover Castle. England has received from the Rhine, the Elbe, and the Norwegian fjords her Teutonic language and the rudiments of her free institutions, while she has taken from the Seine, and from the western Mediterranean beyond, her Christianity and her scholarship. Scandinavia on the one hand and Spain on the other possess a geographical separation almost as definitely secure as that of Britain, but Scandinavia is Teutonic and Spain is Romance. Britain has been cross-fertilized from both sources.

Moreover, Britain has re-acted upon the dual Europe with the power due to her position. If the adjoining continent, with its greater population and greater aggregate wealth, had been united politically, the independence of Britain would have been impossible. As Mr. Peel has shown in his article (see GREAT BRITAIN—FOREIGN POLICY IN RELATION TO EUROPE), we have at most times used our power to defeat every bid for general European dominion. Rome conquered a large part of Europe and she also subdued Britain. Napoleon's aim was to invade England, and England only defeated him by overthrowing his European Empire. The task of holding Europe disunited has been facilitated in every age by the fundamental antagonism of Roman and Teuton. Britain's immediate neighbors across the Channel, to-day, as in the time of Napoleon, of Louis XV., of Louis XIV., and of Charles V., are on the Rhine and also on the Seine. In the same connection let us note that in the year 1066, at Stamford

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Bridge and at Hastings, England exchanged, as Dr. Hodgkin points out (*THE CONQUESTS*) in this volume, a period of Teutonic for a period of Romance influence.

5. *Climate Determined by Oceanic Winds.*—Britain lies further north than any other country of equally old civilization. Great Britain occupies almost precisely the same latitudes as Labrador. The prevalent westerly wind from the Atlantic, and the set of the Atlantic waters from the tropical southwest carry the warmth and moisture of lower latitudes into a great climatic bay over Britain, in which long frosts and long droughts are equally rare. Unlike either the south or the east of Europe, there is labor in the fields at all seasons, for Britain has neither a Mediterranean summer nor a Russian winter. May not the moral effect of this continuity of effort account for some of the so-called Anglo-Saxon characteristics? Yet the mists of the oceanic air and the long northern nights are often as unfavorable to repose in the open as the other conditions are favorable to work there. Hence a second Anglo-Saxon characteristic, the home round the fireside.

Nor, it must be remembered, is climatic control limited to agriculture and domestic conditions. There are splendid waterways in the wide plains of eastern Germany and Russia, but navigation is there intermittent owing to the long grip of the winter frosts. The rivers of Spain and Italy have abundant volume after the rains and the thaw in the mountains, but they are reduced in the summer to strips of pebble desert. The smaller waterways of England, closed neither in winter nor summer, were long ago made navigable by means of locks.

6. *Internal Natural Divisions.*—Britain is divided into the two islands of Great Britain and Ireland. The same causes which have separated British conditions as a whole from those of continental Europe have of course tended to separate Irish conditions from those of Great Britain, but they have acted with less effect, because Britain by her position has been driven to obtain sea power, and thus for many purposes to remove her frontiers from her own coast to the coasts across the water. Thus Ireland has been strategically enveloped by England, yet because adequate English manpower was lacking in the time of Henry II., Queen Elizabeth, and Cromwell, was never completely assimilated to England. Ireland conquered, and necessarily conquered, by England, is in the position that Britain would be in if there were a united Europe across the Channel. Had Ireland been an organized kingdom in the early Middle Ages, instead of a group of rival and hostile tribes, she would have supported Scotland against England, would have retained her independence longer, and when modern conditions rendered union inevitable, would have come into the sisterhood like Scotland as an organized force capable of holding her own.

What every map does not show, however, is the coherent area of bleak uplands occupying the centre of the length of Great Britain, and dividing the agricultural lowland of England from the smaller lowland of Scotland. This upland area has no single name, but is known in different parts as the Southern Uplands of Scotland, the Cheviot Hills, the Pennine Moors,

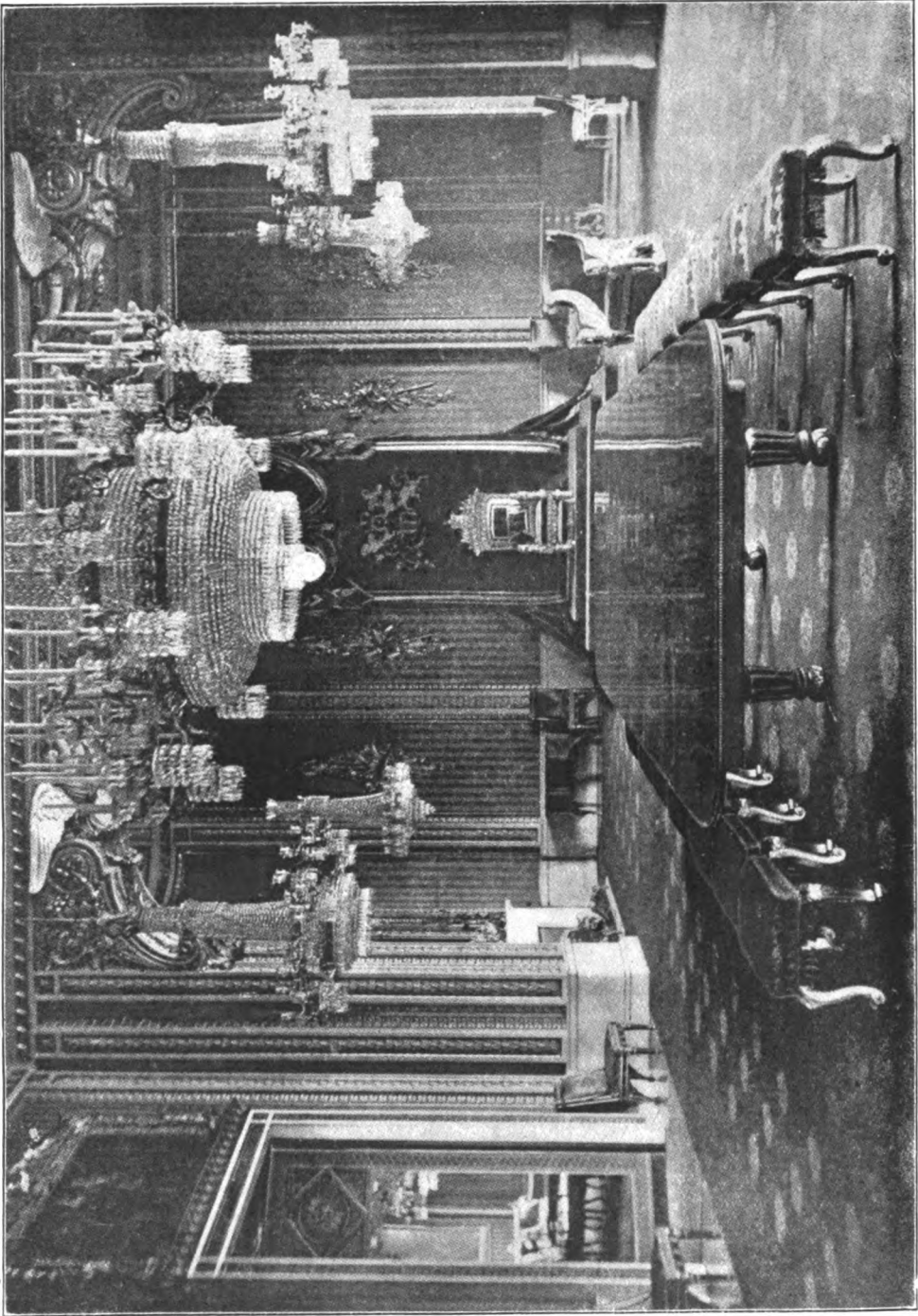
and the Lake Mountains. Until a century and a half ago it had but a sparse population, and was in fact a broad natural frontier between the England of London and the Scotland of Edinburgh. This "border," utilized by a people of Teutonic tenacity, was the geographical position from which Scotland for six centuries held at bay the superior might of England. Not a little of the effect of modern British action in the world is due to the interaction of the two national characters thus evolved in antagonism.

The central uplands of Great Britain between England and Scotland are now the seat of great industries, and for most purposes the two countries form a single economic organism. But in the Highlands of Scotland on the one hand, and in the broad upland of Wales on the other, a remnant of Celtic speech still survives. In all parts of the world there is a marked contrast between the highlander and the lowlander, but this contrast is here increased by that between Celt and Teuton. Formerly marriage was between neighbors, and provincialisms were inbred. But modern facilities for communication lead to distant intermarriages, which are rapidly imparting a national solidarity of blood to states like Britain. This crossing of highlander and lowlander, Celt and Teuton, within Britain must be productive of a change in the race which may prove something far other than the mere striking of an average.

7. *Adequacy of Economic Bases.*—All the preceding advantages—insularity, shallow surrounding seas, continental neighborhood, linguistic division among rivals, soft climate, and internal stimulative contrasts—would, however, have been of little value unless Britain had had length and breadth enough to supply the economic bases for a people able to count among the Powers of Europe. It is therefore important to note on the map of Europe a certain rough equality as between the great natural regions—the Spanish, Italian, and Balkan Peninsulas; the plain of the Middle Danube; the French land between the Alps, the Pyrenees, the Bay, and the Channel; the north German plain; and the southern habitable portion of Scandinavia. Even the vast Russian plain, after all only partially European, must not deceive by the space which it occupies on the map. North and east of the great bend of the Volga at Kazan it contributes little to the strength of the Russian people. Many advantages and disadvantages, moreover, compensate for such differences of mere area in this bundle of natural regions which we call Europe. Thus there is a rough equality of resource among the tenant nations, and this has sufficed for a balance of power during several centuries.

Until within the last few generations agriculture was the chief economic base of these nations. For the reason given just now—the separation of their agricultural plains—England, Scotland, and Ireland were separate economic organisms. Relatively to her population, England was until lately so adequately endowed with land that in the Middle Ages she was the principal exporter of wool, and in the 18th century, of wheat, to the continent of Europe. The vast improvement of agriculture achieved by the English farmer in the 18th century was one of the chief causes—if not the chief—of the

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wealth which enabled England to defeat Napoleon. (See GREAT BRITAIN—AGRICULTURE IN THE 18TH CENTURY, by Dr. Knowles).

Though agriculture still remains the greatest single industry, yet by the aggregate of her industries Britain is now an industrial rather than an agricultural country. In other words, she rests on her output of coal rather than of wheat and meat. The change has, however, been fully accomplished only in the last two generations.

The new economic conditions have been variously influenced by geography. In the first place Scotland has been effectively united to England. The barren uplands in the north of England—in the isthmus, that is to say, connecting the two countries—are rich in coal, and a population has grown up in this part of the island drawn both from Scottish and English sources, and of an intermediate character. Moreover, Scotland, by virtue of her own coal, has been able to share in the advantages of the imperial and economic policies of England. At the time of the union of the two parliaments in 1707 Glasgow was only a village.

The dominance of the trader over the farmer led in the 19th century to a reversal of the long-settled British policy of protection. England and Scotland no longer rest economically on the resources of their own territories. They produce coal, and are the seat of labor and of capital, but four-fifths of their wheat they import, and one-fifth of their people are engaged on manufactures for export. Ireland, however, has very little coal, and must still depend on her agricultural products. Thus, while Scotland and England are now a single economic organism, Ireland—with the exception of Belfast—is another and separate organism. There is an antagonism of economic interest between Ireland and Great Britain which may be compared to the antagonism of interest between the Southern States and the Northern before the Civil War. If in her own interest Great Britain were to revert to her former economic policy, an incidental result in the long run might possibly be to reconcile Ireland to her.

8. Geographical Momentum.—We must not however seek to ascribe the present strategic and economic position of Britain in the world, in so far as it depends on geographical causes, wholly to the present action of those causes. There is such a thing as geographical momentum. The causes which originally led to the establishment of a market in a given place may have ceased to act, but the habit of the customers will long compel salesmen to resort to it. London at the present moment is the greatest general store in the world. It has no staple industry, but parcels of almost everything manufactured in other parts of Britain, and, indeed, in almost all parts of the world, are warehoused there. Except for large quantities of staple goods, many smaller communities find it convenient to give their orders and to make their payments in London. Formerly, no doubt, as Emerson has said, England as the great shop-keeping nation had a good stand in the world. Her chief customers were along the European coast opposite. But now part, at any rate, of her influence is due to momentum from the past, to the start given to her during the Napoleonic Wars, and by the

fact that in the days before railroads she had coal near the waterways.

9. The Consequences of Sea Power.—Britain now lives in part on the products of her own land and seas, in part as a manufacturer for other countries, and in part as a market. But she also obtains profit from her position as the chief sea power. By this power she prevents her enemies from uniting, she retains certain open markets, and she protects her carrying trade. Sea power, however, is a condition of the existence not only of the British Empire, but also of the United Kingdom. This was early made evident. When Edward the First conquered the Principality of Wales, he moved the fleet of the Cinque ports, then the only fleet available for the English king, into the rear of his opponent. This he could not have done had not the Lord of the Isles been defeated shortly beforehand by the Scotch. For several previous centuries sea power along the oceanic borders of Britain had been in the possession of a Norse state established in the fringe of islands which extend round the west of Scotland from the Shetlands to the Isle of Man. Unless Britain has command of her seas the Shetlands and the Orkneys, and indeed Ireland itself, might be held by the foreigner against her, and the foreign invader might establish his bases even in the remoter peninsulas, say of Scotland or Wales. It was from such a peninsular base at Lisbon that Wellington conducted the war against France at the beginning of the 19th century.

The very need of sea power, or in other words, of the sea itself, renders it impossible to put territorial limits to naval action. Britain can command in the British seas only if she can also command in waters more remote. Her fleets are now concentrated in European waters because her possible naval opponents are there to be found, and for no other reason. It follows, however, that Malta and Gibraltar, the bases of the Mediterranean and Atlantic fleets, are in reality not merely milestones on the road to India, but also outposts for the defence of London. It is this characteristic of sea power, now familiar to all the world through the writings of Captain Mahan, which renders it necessary for modern Britain—faced by Powers that rest upon half continents—to extend her economic bases beyond her original insular territory. Whether this is to be done by the method of increasing the insular factories and holding open the over-seas markets, or by such a federation with her colonies as will in effect base her navy on the agriculture and factories of a wider land, is the present issue of British politics—the outcome of many centuries of history in an insular and yet European geographical environment.

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GREAT BRITAIN—THE CONQUESTS

3. Great Britain—The Conquests. Two, at least, of the great inrolling waves of conquest, which have left their mark on the people and the institutions of Britain, had spent their force before any historian arose to record them, and are thus for us like the forgotten events of our unconscious childhood. As to these we can only speak darkly and doubtfully according to the scanty evidence furnished by excavations of the barrows in which the bones of Prehistoric Man are laid. Judging from these, we are able to say that in the dawn of the history of Britain, our island was inhabited by a race ignorant of the use of metals, of the manufacture of pottery, and of the art of weaving, but accustomed to the use of stone implements such as wedges, axes, and hammers, which they fashioned with considerable skill. This race is one of those called Neolithic, to distinguish them from the incalculably older races of Palæolithic Man, who also used stone implements, but who lived before that mighty parenthesis in human history which is called the Great Ice Age. What the Neolithic inhabitants of Britain may have called themselves we are utterly unable to say. For convenience they are generally spoken of as Iberian, in order to indicate a possible connection with the aboriginal inhabitants of Spain, now represented by the Basques; but this connection is only an ethnological guess and must not be taken as an established fact. The race in question buried their dead in long barrows, the excavation of which shows that they were of short stature, with skulls tending to the long rather than the broad shape (Dolicho-cephalic rather than Brachy-cephalic) and that they were probably black-haired and of dark complexion.

To these aborigines of Britain entered two tall and fair-haired races, both of them probably belonging to that great family of nations which we call Celtic. The first of these invading races wielded weapons of bronze; the second was acquainted with the use of iron, and this may account for their victory over their predecessors. At present the tendency of scholars is to identify the bronze-using people with the Gaels (or as they are now generally termed the Goidels), who have left their chief mark on the populations of the Scottish Highlands, of Ireland, and of Gaul. The wielders of iron would be the race (now called Brythonic) which gave its name to Britain; which occupied the greater part of the southern half of the island when Cæsar landed; which survives under the name of Cymri in the mountains and valleys of Wales; and whose language, once spoken in Cornwall and Cumberland, is the dearest possession of the eloquent Welsh and has a large currency among the peasants of Brittany. As to the date of these several movements accurate information entirely fails us, but it is probable that several centuries elapsed between the arrival of the two waves, the Goidelic and the Brythonic, and that all had been accomplished several generations before the birth of Christ.

It was in the year 55 B.C. that the Roman eagles were first seen on this side of the straits of Dover. Whether Julius Cæsar seriously contemplated the conquest of Britain, or whether his two expeditions in that and the following

year were only theatrical performances meant to overawe the tribesmen of Gaul and to dazzle the populace of Rome, is a question not easily answered. It is certain that, if an abiding conquest was his aim, he had greatly underrated the difficulty of the task. His own narrative, much more candid than that of most generals who indite their own bulletins, shows clearly that neither expedition was really successful, that the Britons fought well, that the dense forests of their land, and the chopping tides of their seas powerfully aided their resistance, and that Cæsar himself, after the midsummer of 54 B.C., never desired any closer view of the white cliffs of Britain.

But though Cæsar was foiled, Rome remained and was still the world-conquering city. In the year 43 A.D. when Claudius was Emperor of Rome, an expedition was fitted out for the conquest of Britain. The commander was the high-born senator Aulus Plautius, and he had under his orders four legions with a proportionate number of cavalry and "allies." The latter were for the most part armed more lightly than the legionaries and were generally stationed in the wings, while the legionaries fought in the centre. The total number of Plautius' soldiers cannot have been less, and may have been considerably more, than 40,000. For 17 years no serious misadventure hindered the onward progress of the Roman arms, though the Silures of South Wales, under their king, Caratacus, kept the invaders at bay for many years. In the year 59, however, we find the Roman general Suetonius Paulinus crossing the Menai Straits and conquering Anglesey, and the Roman soldiers quartered at Chester and at Lincoln. Then came (60) a terrible reverse of fortune, the only serious set-back to the Roman career of conquest in these early centuries. Maddened by the tyranny of a grasping Roman official, Boadicea, queen of the Iceni (a tribe who inhabited what is now the county of Norfolk), called her countrymen to arms, sacked the Roman colony of Camulodunum (Colchester) and the cities of Verulamium and Londinium, and threatened to root the Romans out of the land. Suetonius, however, hastened back into the centre of the island and there, giving battle to the far more numerous forces of the barbarians, achieved a decisive victory.

After this the Roman frontier was pushed steadily forward, especially by the famous general Julius Agricola (78-84) till it nearly coincided with that which is now the northern boundary of England. About the year 120 the Emperor Hadrian is believed to have built that noble stone wall from the estuary of the Tyne to the Solway, of which important fragments still remain, forming one of the most interesting memorials of Roman domination north of the Alps. Another wall, of turf, was drawn by Hadrian's successor, Antoninus Pius, across the lowlands of Scotland from Forth to Clyde, but it was probably not maintained for long as a boundary of the empire, and the hold of the Roman legions on any part of Caledonia was always precarious. We cannot now do more than briefly allude to the expedition of the aged Emperor Severus, in which he is said to have reached the northern extremity of the

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island and carefully noted the duration of the long midsummer days.

Notwithstanding many incursions of the barbarians, and the obviously failing strength of the Empire, the 3d and 4th centuries were probably not on the whole calamitous times for the now reconciled and submissive inhabitants of Roman Britain. At last in 383 a general named Maximus rebelled against the Emperor Gratian, assumed the purple robe, and carried his legions into Gaul to enforce his claim. It may be doubted whether the wealthy and timid provincials ever slept soundly after that fatal departure. True, the rebellion was in course of time suppressed, and some portion of the legions struggled back to Britain, but more mutinies followed, Rome itself was in danger from Alaric and his Goths, and at last about 407, the last of the Roman legions quitted the island never to return.

Of the next act in the great drama, the conquest of England by the English, we have hardly any trustworthy information. The broad outlines of the conquest may be traced. Three tribes of the Low German stock from the shores of the Baltic and the North Sea certainly established themselves here in the course of the 5th century. The Jutes settled in Kent and the Isle of Wight, the South Saxons gave their name to Sussex, the East Saxons to Essex, the West Saxons established themselves in Hampshire and Wilts, the East Angles in Norfolk and Suffolk, the Middle Angles in the Midland counties where they founded the kingdom of Mercia. Deira and Bernicia, the two kingdoms which sometime coalesced into Northumbria, were also Anglian settlements: but how and when all these territorial changes took place we really cannot state with certainty. Even the 'Saxon Chronicle,' which professes to give dates for the foundation of the kingdoms of Kent, Sussex, and Wessex, tells us scarcely anything about Northumbria in these early years, and nothing at all about the other three kingdoms.

The ordinary story of the Saxon conquest is thus told. On the departure of the Roman legions the Britons, sore pressed by the incursions of the Northern and Irish barbarians, the Picts and Scots, called on "Aëtius, thrice consul," for aid which he was unable to give them. Thereupon they foolishly turned to the Saxon and kindred continental tribes for help. Hengist and Horsa, Jutish princes, came at the call, landed on the coast of Kent, repelled the Caledonians, but refused to quit the country after the work of liberation was accomplished. The infatuated passion of Vortigern, the elderly British king, for Rowena, daughter of Hengist, aided the designs of the invaders, who sent over to the continent for more and ever more of their countrymen till the conquest at least of the eastern half of the island was accomplished.

For the story thus told the evidence is not satisfactory. It chiefly consists of the narrative of a Welsh ecclesiastic named Gildas, who lived a century and a half after the legions quitted Britain, and who, though an earnest Christian patriot, was evidently but slenderly furnished with historical knowledge. Nor do the very meagre details of the conquest which are supplied by the 'Saxon Chronicle' carry us much further. That Chronicle was itself probably not

compiled till three or four centuries after the invasion, though some of the material included in it may be of a much earlier date.

On the whole all that we can safely say appears to be that apparently throughout the 5th century a series of attacks on the Romano-British population was being made by the Germanic tribes which the Romans had known by the name of Saxons. These attacks had begun, even in the 4th century and, in order to guard against them, the emperors had created a high official who bore the name of "Count of the Saxon Shore." The invasion may possibly have culminated in the year 449, the year assigned by the 'Saxon Chronicle' to the landing of Hengist and Horsa, but there is some reason to think that even that specific event took place eight years earlier. The name of the first West Saxon chieftain, Cerdic, interests us because it is from him that the present royal house of Great Britain derives its origin. His career of conquest, which had been most successful, was possibly stayed about the year 516 by a great victory which Gildas reports the Britons to have won at "Mount Badon." In the present state of our historical knowledge no one can deny that this victory (about which the 'Saxon Chronicle' is silent) may have been won by a Romano-British hero named Arthur.

About 60 years later (577) the great victory of Deorham, won by Ceawlin, the grandson of Cerdic, once more carried forward the invading flood and finally separated the Britons of Wales from their kinsmen in the district which was then called West Wales, but which we now know as Cornwall.

The Saxon conquest was apparently never an easy one, and became harder and slower as time went on. By the middle of the 6th century, roughly speaking, the invaders occupied all of England that lies east of a line drawn from Berwick to Portland; but it had taken at least three generations to reach so far. Then came the above-mentioned victory of Deorham and the extension of the Saxon border far into Devonshire. In the North-west during the 7th and 8th centuries, the Northumbrian kings cut short the British kingdom of Strathclyde, and perhaps reduced it into a condition of something like vassalage. On the Welsh marches, Offa, the great king of Mercia, in the 8th century, carried the western border of England from the Severn to the Wye, and by a substantial earthwork, some vestiges of which still remain and are known as Offa's Dyke, fixed the dividing line between England and Wales almost in its present position. The actual conquest of Wales and its complete subjection to the English kings had to wait till the 13th century, when it was accomplished by Edward I.

The four centuries which intervened between the departure of the legions and the accession of Egbert are generally felt by the historical student as a wearisome interlude in which nothing is done toward the real business of the drama, the creation of an united England. In truth, no thought that such was the real action of the play probably visited the minds of the chief performers. The invaders belonged to various clans, tribes, and communities, and though they must have spoken the same or nearly the same language, they had only the

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feeblest conception of duty toward one common country. Even within the limits of the same race we look in vain for any active principle of brotherhood. Angle seems to war against Angle, and Saxon against Saxon, just as cheerfully as either would war against the other. It is true that the moral conquest which lies outside the scope of this paper, the conversion of the English to Christianity (600-686), did something toward quickening the sense of national unity; but notwithstanding the Church's influence, this was still weak when Egbert ascended the West Saxon throne, nor can he, notwithstanding the ascendancy which he exercised over the other still subsisting kingdoms, be regarded as truly king over all England. It was the terrible Danish invasions and the fact that only one champion, the hero king of Wessex, was found able to resist them, which finally established the unity of Anglo-Saxon Britain under the rule of Alfred and his descendants. We call the new invaders, for convenience sake, Danes, but in truth they came not only from Denmark, but from Norway, perhaps from all the harbors of the Scandinavian seas. In 789 the Danish storm began to blow, and with one or two lulls, it blew for three centuries, till Harold Hardrada lay dead on the field of Stamford Bridge. In the year just mentioned (789) three Danish ships appeared off the coast of Devonshire. The mariners resisted the attempt of the king's steward to levy toll upon them, slew him, and sailed away. Four years afterward came another and more deadly invasion. "The heathen men," says the Chronicle, "miserably destroyed God's church at Lindisfarne, with rapine and slaughter." This ravage of one of the holiest places in Western Christendom showed the savage heathenism of the invaders and struck terror into the hearts of noble and peasant alike, who saw that no sanctuary could be of any avail when the terrible raven standard of the Danes was flapping in their harbors.

The usual course of one of the early Danish invasions was something like this. When spring days dawned a little fleet of ships, or rather long boats, undecked, with one mast in each, and seats for 60 rowers, would push off from the Danish or Norwegian coast and appear in English or French waters. (It must be remembered that France and Germany suffered almost as severely as England from the Danish ravages.) The mariners steered their barks into some estuary, such as that which then severed Thanet from the mainland, and leaving them there under a sufficient guard, spread themselves over the country in quest of horses. When they had thus mounted themselves at the expense of the victim country, they made rapid excursions far and wide over the land, burning towns, plundering monasteries and churches, fighting with and generally defeating the *ealdorman* or lord-lieutenant of a county, who at the head of his rustic militia (*fyrð*) came forth to fight his brave but stupid battle of defense. Their enemies accuse them of inhuman crimes: the torture of prisoners, the violation of women, the mirthful slaughter of little children; but there is some doubt how far these atrocities can be fairly taken as typical of the general character of the Danish invasions. Of one feature of these invasions there can be no

doubt: that is, of the special hostility which they displayed to the churches and monasteries of Western Europe. The historical literature of our country has probably to lament the loss of priceless manuscripts, especially in the convents of Northumbria and Mercia, caused by the ravages of the Danes.

When the summer was drawing to a close, and when the long boats were gorged with the plunder of half a dozen counties, the unwelcome intruders would return to their ships, glide away out of the channel in which they had cast anchor, and for that year the harried and wasted land would see them no more. This, at least, was the case in the first stage of the invasions, for about 60 years after the sack of Lindisfarne. Then, in 851, as the Chronicles tell us, "the heathen men settled themselves over winter in Thanet." From that time the invasions of the Danes assumed a more and more permanent character: from mere freebooters they became conquerors: Northumbria and Mercia were bound to their chariot wheels, and the whole of England would have been subjugated by them but for the war of liberation which was successfully waged against them by Alfred the Great (871-900).

Though Alfred broke the Danish yoke, and although his son and grandson, Edward and Athelstan, triumphantly asserted the supremacy of the English crown over the Danish chieftains who were left in the land, the result of the warlike operations of the 9th and 10th centuries was to cause an immense infusion of Scandinavian blood into the population of England. The Danelaw, as it was called, included the greater part of the country northeast of the Watling Street, the old Roman road which ran from London to Chester; and in many parts of this region, notably in Lincolnshire and the East Riding of Yorkshire, the names of places still bear witness by their terminations to the existence there of a large number of Danish settlements. It cannot be doubted that this Scandinavian element when subjected, as it soon was, to the humanizing influence of Christianity, was a most valuable and virile ingredient in the population of England.

Through the greater part of the 10th century the Danish inhabitants of England were kept under by the strong hand of the English kings, and the Danish invasions nearly ceased. Near the end of that century they were resumed, and owing to the portentous weakness of Ethelred and his counsellors, they achieved a greater measure of success than ever before. An archbishop was martyred; six successive payments of tribute were paid in the vain hope of inducing the invaders to cease from ravage; and finally the descendants of Cerdic had to quit the realm, and Canute the Dane sat upon the throne of England. As king, however, the Scandinavian conqueror healed many of the wounds which his countrymen had inflicted as ravagers; and the long and prosperous reign of the Christian Canute marks practically the end of the period during which the Danish pirates were a source of terror to the Saxons. The reign of Canute, however, coincided with one event in the nature of a conquest, not favorable to England. In the year 1018 Malcolm, king of Scotland, won the battle of Carham over the

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men of Northumbria and thereby succeeded in forcing back the English frontier from the Firth of Forth to the line which it now occupies of the Cheviots and the Tweed. The rich country of the Lothians, which for near five centuries had formed part of the kingdom of Northumbria, was now permanently added to Scotland.

The line of Canute came to a speedy end in the persons of his worthless sons; and thereafter, during the central years of the 11th century, under the reign of Edward the Confessor, there was going forward a peaceful conquest of England by the Normans under favor of the Norman-minded king. In truth there was much to admire in this young Norman race, strong with Scandinavian energy, but refined and liberalized by the memories of Roman culture which still lingered in the shattered empire of Charlemagne. Hard and grasping as the Norman warrior might be—and William the Conqueror was a typical Norman in this respect—he was at this period generally chaste and temperate. His devotion to the Church was not a mere hypocritical pretense, nor was it only testified by the magnificent cathedrals which he erected. As statesman, as architect, and as warrior, it must be admitted that the Norman knight much outshone the Saxon *thegn* whom he supplanted.

The peaceful conquest of England by Norman influence which had been for a time arrested by the successful rebellion of the half-Danish family of Godwin was succeeded by the bloody conquest of 1066. Many causes concurred toward this event: the utter feebleness of the representatives of the line of Cerdic; an uneasy consciousness that Harold Godwinson, who had been raised to the throne on the death of Edward the Confessor, was no rightful wearer of the West Saxon crown; the long-lasting feud between his family and that of the sons of Leofric; but above all the grievously ill-timed invasion of the Norwegian Harold Hardrada. It was on an ill day for Scandinavia as well as for himself that he landed with his ally, the traitor Tostig, on the coast of Yorkshire. Unable to conquer England himself, and winning nothing from her king but the seven feet of earth assigned for his grave at Stamford Bridge, he nevertheless left her panting and breathless for the encounter with a mightier and unwearied foe.

By the battle of Hastings, England, which had been for centuries closely linked with Scandinavian interests, was wrenched away from that connection, and was forced to revolve in the same orbit with the Latin-speaking races of western Europe. A revival of the empire of Canute, which had bound England, Norway, and Denmark together, was made forever impossible. The eyes of the English king turned henceforth toward Rouen, Paris, Angers, Bordeaux; the lands of the northeast on the far side of the German Ocean were to him a well-nigh forgotten world.

As a matter of tactics the victory of Hastings seems to have been due to William's skillful combination of archers and cavalry. The English forces, though much more imperfectly disciplined and less inured to war than the Normans, stood well at bay for many hours behind the shield-wall which they knew so well

how to weave, but they were galled by the thick-flying arrows of the Normans, and were tempted, by the feigned flight of the enemy, to rush down the hill after them. Then did William's cavalry, galloping up, thrust themselves in between their broken ranks, and throw them into confusion from which they never recovered. Since the 14th of October 1066 no foreign conqueror has permanently established himself on English soil, and we may therefore here close our brief and rapid sketch of the Conquests of England.

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For later history it will be sufficient to refer to J. R. Green's 'Making of England' and 'The Conquest of England,' to E. A. Freeman's 'Norman Conquest,' to Sir James Ramsay's 'Foundations of England,' and to C. F. Keary's 'Vikings in Western Christendom.' But for the whole subject of the bibliography of English history from the earliest times to the 15th century no better guide can be found than 'Sources

GREAT BRITAIN—MEDIÆVAL ENGLAND

and Literature of English History,' by Charles Gross, of Harvard University.

THOMAS HODGKIN,
Author of 'Italy and Her Invaders,' 'Life of Charles the Great,' 'Political History of England' (Vol. I.), etc.

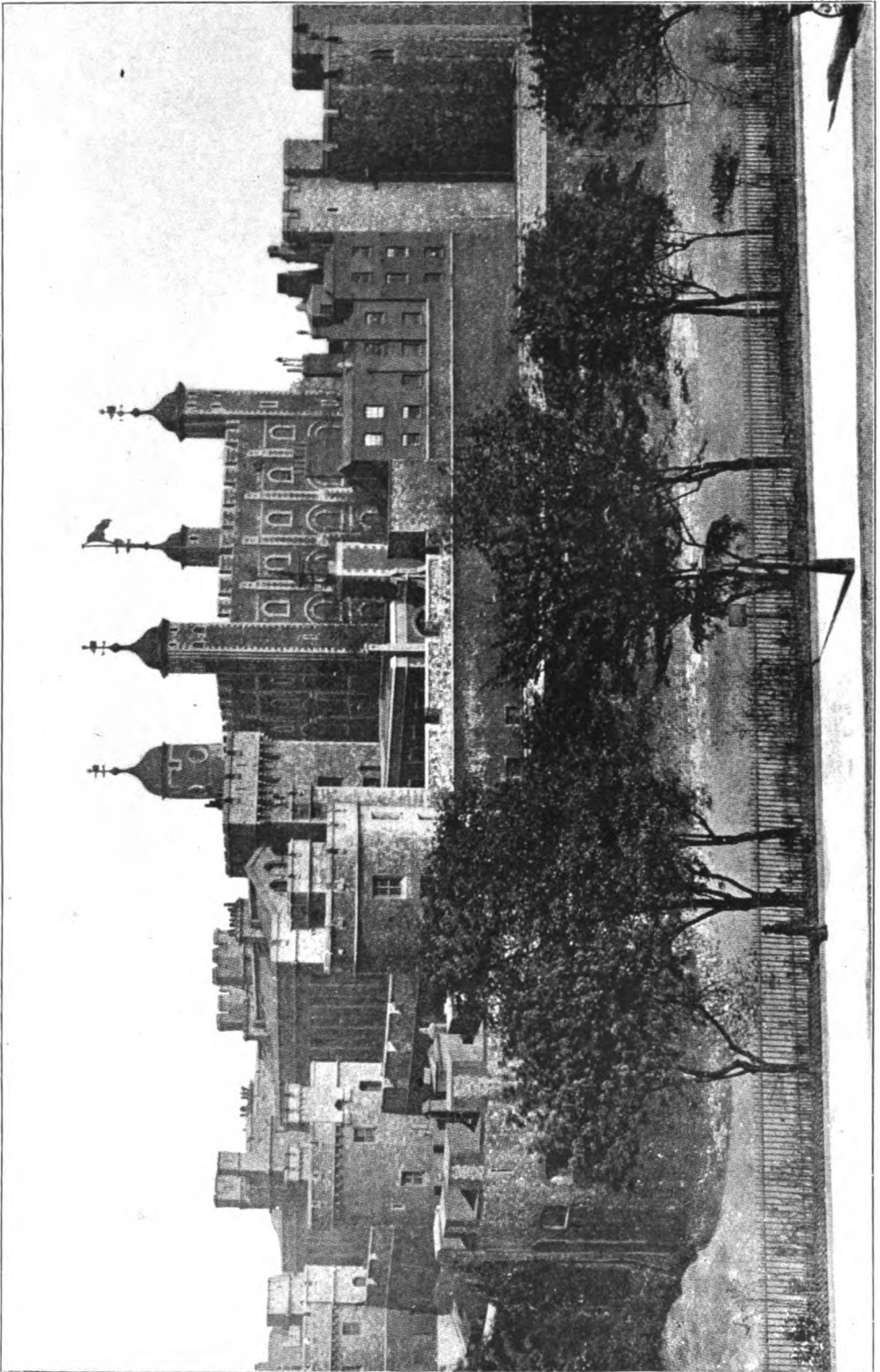
4. Great Britain—Mediæval England. The foreign invader had finished his task when the last results of the Norman conquest of England were slowly worked out during the Norman and Angevin periods. For the future the development of the country was to depend upon resources supplied from within. The first stage in this new growth is marked by the reigns of Henry II. and his sons. From one point of view Henry II.'s work was but a continuation of that of his grandfather, Henry I. Recent investigation has shown that few of the characteristic features of Henry II.'s policy were specifically his own, and that he never departed far from the lines laid down by his grandfather. Yet the use Henry made of the materials thus provided for him constituted a new departure in our history. Dr. Stubbs' well-known description of Henry's reign as a "period of amalgamation" remains as true as ever. Before his days, the English and Norman peoples and English and Norman institutions remained separate, though side by side. It was the mission of the Angevin despotism to grind down both English and Norman into a common nation with a common set of institutions. At first the process was a mechanical one, for the combination was due exclusively to the will of an absolute monarch, working through the most effective administrative machinery which mediæval times had up to now witnessed. As long as the Angevin despotism remained intact, the English and Norman races and institutions continued to be kept together through this external pressure. But they became accustomed to the new conditions, and when the system of Henry II., which had survived the neglects of Richard I., broke down through the active tyranny of John, the union had become organic to such an extent that it continued, despite the relaxation of the severe pressure which had brought it about.

The most permanent feature of Henry II.'s work lay in the establishment of the unity of England, and the control of the country by a unified administration dependent upon the central power. Though the upper classes long continued to speak French and to bear French names, they became as English in spirit as their native-born tenants and vassals. Yet neither Henry nor his subjects had any consciousness of the results of his work. Henry selected England for more treatment than he devoted to the rest of his dominions, not because he was an English patriot, but because circumstances gave him greater control over his English kingdom than over any other part of his extensive territories. His own personal ambition was rather to build up a cosmopolitan Angevin empire, than a national English kingdom. This ideal could not be realized because it brought his house into direct conflict with the growing monarchy of France, whose kings were engaged in carrying out over their dominions similar work to that which Henry had accomplished for his island kingdom. With the

falling away of Normandy, Anjou, and Poitou from John, and their absorption into the monarchy of Philip Augustus, the Angevin empire collapsed. Henry II.'s continental possessions had contributed next to nothing toward the development of England, but the work he had accomplished in unifying them had materially smoothed the path by which the French national state was to attain to greatness. The retention of Gascony in the hands of the English kings kept up the friction between the two nations and brought about that hereditary enmity of France and England, which was so characteristic a feature of all later mediæval history. Thus the failures as well as the success of the Angevin rulers had their permanent importance. This was even more notably the case with other aspects of Henry II.'s policy which may be described as premature rather than as impossible. Conspicuous among these were the efforts of Henry II. to enlarge the English kingdom into a monarchy over all the British islands. The conquest of the more fertile parts of Ireland by Anglo-Norman feudal adventurers set up in that island the uneasy dependence of a Celtic people on the English King's feudal vassals which had already been established in southern and eastern Wales since the days of Henry I. Side by side with this, something like a Norman conquest of Scotland was effected, not so much by the enforced recognition of English supremacy by unwilling Scottish kings, as by the gradual infiltration into the northern kingdom of the system and habit of thought which had gained the ascendancy in Henry's own realm. Even the least successful of Henry II.'s efforts was not without influence on the future. After the martyrdom of Saint Thomas of Canterbury, Henry II. renounced as hopeless any heroic attempt to limit the sphere of the jurisdiction and authority of the Church. Yet his watchfulness in controlling and regulating what he deemed the usurpations of the clerical power was renewed from time to time by the more strenuous of his successors, and finally attained a full triumph in the period of the Reformation. For all these reasons, the reign of Henry II. is among the most pregnant of future consequences in all British history.

The personal prowess and contemporary fame of Richard I. cannot blind us to the insignificance of his reign in results. His brother, John, was the worst and most unlucky of English kings, but the consequences of his failures and blunders determined the whole future course of English history. John's unsuccessful conflict with Innocent III. emphasized that triumph of the Church, which even his father had been unable to prevent. The break up of the Angevin empire, though precipitated by his caprice and neglect, was sooner or later inevitable. More important than either of these was the reaction against his domestic authority, which resulted in the union of barons and people in an effort to limit the autocracy of the Crown. The Angevin despotism had done its best work in bringing about the union of England. Like all despotisms, it was a bad thing in itself, even when necessary as the only alternative to feudal anarchy. In John's capricious hands it did not so much as secure the continuance of the law and order for which England had long been willing to pay a

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THE TOWER OF LONDON.

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heavy price. When the mass of the English people, abandoning their traditional devotion to the monarchs who had saved them from feudal disorder, united with the baronial leaders to wrest from the unwilling king the grant of Magna Charta, the first faint beginnings of English liberty and constitutional government were already at hand.

Of recent years it has become almost the fashion to decry the importance of Magna Charta. It is easy to see that John, in sealing the charter, thought of nothing but obtaining a momentary respite, and repudiated his act as soon as he found it safe to do so. It is equally patent that the barons who forced John to accept the charter were mere feudalists, careless of all but their personal wrongs and the grievances of their class, and quite unconscious that they were acting otherwise than their ancestors had always acted. Yet emphasizing the unworthiness of these men should not blind us to the significance of their work. However unconscious they were of their high mission, the Fitzwalters and the Vescys were in a very real sense the pioneers of English liberty. The opportune death of the tyrant, the withdrawal from England of the barons' dangerous ally, Louis of France, and the wisdom of the papal legate, Gualo, who accepted in the name of his ward, the infant Henry III., the charter which John had repudiated, insured the permanence of their principles. For nearly a century the great event of English history is the struggle for the charter. Under the long minority of Henry III. the ideas of limited monarchy and constitutional control, which were its essence, had time to assert themselves. When the young king attained manhood, his personal weakness made impossible any effective attempt on his part to carry on the government on autocratic Angevin lines. The aristocratic control of the administration was now secured, though it was long before that control was vigorous or effective. The chief danger to England was that the nobles in resuming their former power might also have fallen back on the old separatist ambitions of their feudal ancestors. Luckily the reaction toward feudalism was slight and easily suppressed. The baronage of Henry III.'s reign was a very different body from that of Norman times, and only a few isolated individuals still cherished the ancient feudal ambition of each nobleman ruling like a king over his own hereditary estate, and caring nothing for the manner in which the central government of the country was carried on. The barons of the 13th century accepted the unity of England, and accepted the central administration which the Norman and Angevin kings had built up. Their chief concern was to see that the government of the country was under their own control, and not regulated by the king's despotic caprice. Thus the unity of England remained, but the central government was henceforth an aristocracy rather than an autocracy. The barons claimed to be the hereditary counsellors of the Crown. Even a strong king was compelled to frame his policy to their liking, and to admit them into a sort of partnership with him. Under a weak king, like Henry III., the barons aspired to rule the realm as they would. Their moment of triumph came in 1258, when the Provisions of Oxford transferred the administration of the country from the monarch to a committee of

15 barons, without whose counsel and consent the king was not permitted to take any action. Thus the Angevin despotism developed into the constitutional monarchy of later times, though at this stage the only effective limiting force was the baronial aristocracy. Side by side with this constitutional development was the blossoming of every aspect of mediæval life, which made the 13th century one of the most brilliant periods of English annals. The age of Henry III. witnessed the consummation of Gothic architecture; the beginnings of the most spiritual aspects of mediæval Christendom in the orders of mendicant friars; the rise of a new intellectual life in the scholastic philosophy, and the organization of teachers and scholars, called universities. For a long time the political weakness of the reign of Henry III. checked the general progress of the nation, but with the revolt of the barons a new political development began.

The purely baronial conception of the English Parliament had hardly been formulated when its inadequacy became self-evident. Even in Norman and Angevin times the authority of the Crown had been largely based on the mute but hearty support which the average Englishman gave to the one power which could maintain order, and save him from the caprice of the local feudal tyrant. The machinery by which this popular backing of the royal authority had been effected still survived in the popular local courts, and the jury system of Henry II. had enlarged the representative principle by affording facilities for representative committees of the shire moots to treat directly with the king or his agents. Administrative convenience and financial necessity brought about during the first half of the 13th century a further extension of the idea of representation. It became not unusual for knights, representing the shires, and burgesses, chosen from the boroughs, to be gathered together in a single assembly to voice complaints, frame laws, testify to ancient customs, and make extraordinary grants of money. Such was the state of things when the narrowness and selfishness of the triumphant baronial oligarchy provoked a strong reaction among their own more enlightened supporters, and gave a unique chance to the broader-minded friends of the monarchy to rescue it from the impotence into which it had fallen. Simon of Montfort, Earl of Leicester, made himself the leader of the former; Edward, the king's son, the future Edward I., put himself at the head of the latter movement. The momentary triumph of Earl Simon over both his baronial colleagues and his royalist enemies was marked by the Parliament of 1265, which, if not the "first House of Commons," was at least the first occasion when the new machinery of representation was applied to the determination of grave political issues. The effect of Simon's work was that the lesser landholders and the citizens were called upon to enlarge the narrow circle which had hitherto alone aspired to control the crown. Though Simon perished within a few months on the field of Evesham, his enemy and supplanter, Edward I., carried on and completed the work. Edward was every inch a king, and loved power too well to abandon any of it willingly. But he dreaded the might of the greater barons and of the still independent Church; he appreciated the advantage of having the people on his side; and

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he was the first king after the conquest who was in a real sense an Englishman. Up to now the progress made in England had been on lines common to all Christendom. There is nothing specifically English in the Church, the friars, Gothic art, scholastic philosophy, the universities, feudal warfare, or even in the system of representative control of the Crown by the estates. At last under Edward I. a newer and more specially national note is sounded. Under this great king the constitutional system became perfected; the council of the nation became permanently strengthened with a popular and representative element; the baronial parliament was enlarged with the three estates of barons, clergy, and commons. Edward I. was even less of an innovator than Henry II., but old ideas took new shapes under his direction. The materials of the Constitution had been supplied during the creative period of the barons' wars. His work, as Stubbs has truly said, was a work of definition. Henceforward the main outlines of the Constitution were clearly marked out and defined. As far as outward forms went, they remained as Edward established them, until quite modern times.

The most permanent result of Edward I.'s work was the creation of the English parliamentary system. Edward's other ambitions were less completely realized. He aspired, with but little success, to maintain his position in Gascony and on the Continent against Philip the Fair, the greatest of the mediæval Kings of France. He aimed at playing a prominent part in Europe, and checking the ever-growing usurpations of the Church in the political sphere, and at establishing his authority over all the British Islands. In most of these directions he was not very successful, except that by the destruction of the state of Llewelyn of Wales he made the English monarch supreme over southern Britain. Even in his lifetime his attempt to absorb Scotland showed no great prospect of success. Under his unworthy son, Edward II., Robert Bruce's great triumph at Bannockburn (1314) secured the independence of Scotland and made permanent the division of the English race into two unequal halves. So far as concerned internal politics, the reign of Edward II. seemed marked by an equally strong reaction. The Lord Earl Ordainers and their leader, Thomas of Lancaster, take us back to the oligarchical atmosphere of the Provisions of Oxford. It was only after their fall that the Despencers identified the triumphant monarchy with the representative parliamentary system. The revolution of 1326, which cost Edward II. his throne and his life, perpetuated the constitutional authority of the estates. During the long reign of Edward III., the king's foreign preoccupations made it essential for him to keep on fair terms with his subjects. The subsidies and support, necessary to enable Edward III. to carry on the early stages of the Hundred Years' War with France, finally consolidated the constitutional fabric and ensured its permanence.

England had already become a nation under Edward I. During the reign of his grandson Edward III. the might of the English state was revealed to all Europe by the extraordinary military successes which laid low the ancient feudal fashion of fighting in famous battles such as those of Crecy and Poitiers. It was

now that the English King first aspired to be lord of the seas, and that English mariners and wool merchants prepared the way for the industrial England that was ultimately to supersede the military state that now claimed a great place in the affairs of Europe. It was the age of Chaucer and Wycliffe, when the English tongue and English literature blossomed anew, and when the new nation became impatient of the narrow limits and strict restraints of the mediæval fashions of life and thought. It was in this age that the Church first provoked successful opposition, and first manifested signs of conscious weakness. The ravages of the Black Death, the direst of mediæval pestilences, undermined the old social order and prepared the way for all that ultimately differentiated the social and economic system of England from that of its continental neighbors. Chivalry, whose deeds were glorified in the pages of Froissart, was threatened with decay at the moment of its apparent triumph. The brilliant successes of the French war were succeeded by disastrous failures. In his embarrassed old age Edward III. saw the loss of his foreign conquests, and the undermining of his authority at home. During the troubled reign of his grandson, Richard II., the economic troubles of the period culminated in that Peasant Revolt of 1381 which, even in its failure, was to ring the knell of villeinage and the old social system. As Richard attained manhood, he ventured upon the most serious effort made by a later mediæval king to overthrow the constitutional system, and strove to make himself an autocrat like his ancestors and his contemporaries, the French kings. His boldness drove him from his throne to a prison where he soon met his fate. With the Revolution of 1399 England was brought back permanently to the constitutional path.

The Revolution of 1399 was a conservative reaction in at least two directions. It restored the old parliamentary Constitution and insured the loyal continuance of a limited monarchy by establishing on the throne with a parliamentary title that house of Lancaster, which since the days of Earl Thomas had almost continuously led the constitutional opposition to the sovereign. Under the Lancastrian kings the mediæval constitutional monarchy attained its height. Not only weak kings, like Henry IV. and Henry VI., were perforce true to their constitutional obligations. We see the same loyalty even in a strong monarch like Henry V., who was vigorous enough to renew Edward III.'s claim to the French throne and lucky enough to profit by French divisions and make himself ruler of the more important half of the French monarchy. Under Henry V. also the other characteristic feature of Lancastrian policy manifested itself most fully. This was the ecclesiastical reaction in favor of the strict orthodoxy with which the house of Lancaster was as much identified as with constitutional principles. If Edward III. and Richard II. had trifled with Wycliffe and his followers, Henry IV. and Henry V. were only content with extirpating Lollardy and all its works. Their policy was made easier by the socialistic and revolutionary extremes into which some of the Lollards had drifted. The early 15th century was not ripe for radical revolution in the Church, and the downfall of heresy was the more rapid and

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complete since Wycliffe's teaching had never really established itself in popular favor. For another hundred years the majestic unity of the mediæval Church was to be maintained. But even leading churchmen were half conscious that the Church's hold over men's mind was no longer what it had been. The life and freshness of mediæval Christianity were gone, even though the Church remained as rich, as proud, and as outwardly glorious as ever. In its weakness the Church clung for support to the State which in the great day of mediæval religion it had aspired to direct and control. A chief feature of 15th century life is the political ecclesiastic serving Church and State with equal fidelity, but discharging his duty to both masters in a thoroughly worldly spirit.

Lancastrian constitutionalism lasted little more than 60 years, though Lancastrian orthodoxy preserved England from religious revolution for nearly a century and a half. It was soon found that constitutional government under mediæval conditions meant weak government. Power went, not to the people at large, but to the great landholders. A turbulent aristocracy took advantage of the rule of a weak king to wage hereditary feuds against its rivals and reduce the land to a condition of chronic anarchy. Things grew worse when a revival of French nationality followed the wonderful deeds of Joan of Arc, and Henry was gradually deprived of the monarchy of France which had been conferred on him in his cradle with the good-will of many millions of Frenchmen. The bloodthirsty heroes of the French war transferred their fierce activity from France to their native land, and the permanent anarchy developed into a generation of intermittent civil war. This is the period of the so-called Wars of the Roses, which, beginning with the first battle of Saint Albans in 1455, went on with occasional breaks until the Battle of Bosworth in 1485. The nominal occasion for these wars was the legitimist claim of the house of York as the true heirs of Edward III., but the real cause of the triumph of York over Lancaster lay not in Edward IV.'s superior nearness in blood to the common ancestor, so much as in the fact that Edward IV. was a strong man who could give the English people the peace and order which were necessary to enable the ordinary citizen to till his farm or transact his daily business. The fall of Henry VI. involved the failure of mediæval constitutionalism, and the supersession of a lawless anarchy that adopted the name of liberty by the capable and autocratic rule of a vigorous monarch, who cared little for constitutional forms and everything for making his authority supreme. Family divisions within the Yorkist house and the last expiring efforts of the baronial party retarded the restoration of a strong monarchy after the death of Edward IV. and gave the house of Lancaster a chance of reasserting itself. Lancaster was now represented by the Welsh house of Tudor, which on the female side claimed a connection of doubtful legitimacy with the line of John of Gaunt. But Henry Tudor's triumph at Bosworth Field meant not the abandonment but the strengthening of the new system of strong monarchy which Edward IV. had first begun. The Tudor despotism continued the Yorkist tradition and made permanent the fall of me-

diæval constitutionalism. But the middle ages were now wearing themselves out. The Church and the baronage had in turn exhausted themselves, and even the disorder of the Wars of the Roses did not do much to check the growth of the middle classes, and the spread of a higher standard of national prosperity than more heroic earlier conditions had permitted. The Reformation and the Renaissance were at hand, and a new chapter in English history was about to open.

Bibliography.—W. Stubbs' 'Constitutional History of England,' in three volumes, gives not only the most authoritative account of the development of the English mediæval constitution, but the most broad and general commentary on the turning points of mediæval political history. More political details can be found in the three volumes of the new 'Political History of England,' edited by W. Hunt and R. L. Poole, which cover this period; Vol. 2, 1066-1216, by G. B. Adams; Vol. 3, 1216-1377, by T. F. Tout, and Vol. 4, 1377-1485, by C. W. C. Oman. For ecclesiastical history, consult W. R. W. Stephens' 'History of the English Church,' 1066-1272; and W. W. Capes' 'History of the English Church in the 14th and 15th Centuries.' Economic history can best be studied in W. Cunningham's 'Growth of English Industry and Commerce,' Vol. 1; and in W. J. Ashley's 'Economic History,' Vol. 1, parts 1 and 2. Much information can be gleaned from the unequal but often useful 'Social England,' Vols. 1 and 2, edited by H. D. Traill. Mary Bateson's 'Mediæval England,' 1066-1350 ('Story of the Nations') is very valuable from the same point of view. Among many studies of detached periods, persons and aspects of the subject may be included Mrs. J. R. Green's 'Henry II.' and T. F. Tout's 'Edward I.' (both in the 'English Statesman Series'); Stubbs' 'Early Plantagenets,' and Warburton's 'Edward III.' ('Epochs of Modern History'); C. L. Kingsford's 'Henry V.' ('Heroes of the Nations'); W. Hunt's 'English Church in the Middle Ages,' and R. L. Poole's 'Wycliffe and the Movements for Reform' (both in 'Epochs of Church History'); G. W. Prothero's and C. Bémont's 'Simon de Montfort,' the latter in French; F. A. Gasquet's 'Henry III. and the Church,' and the same writer's 'English Monastic Life' ('The Antiquary's Books'). Kate Norgate's 'England under the Angevin Kings' and 'Jack Lackland' are important for the 12th and early 13th centuries; H. W. C. Davis' 'England under the Normans and Angevins' is valuable up to 1272; G. M. Trevelyan's 'England in the Age of Wycliffe'; A. Réville's and C. Petit-Dutaillis' 'Le Soulèvement des Travailleurs d'Angleterre en 1381'; J. H. Wylie's elaborate 'History of Henry IV.' (4 Vols.); J. Gairdner's 'Introduction to the Paston Letters,' and the same writer's 'Life and Reign of Richard III.' Sir J. H. Ramsay's 'Lancaster and York' (2 Vols.) are a great storehouse of facts for the period 1399 to 1485.

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5. Great Britain—The Reformation. There are three main factors in the Reformation. It represents, first, the conflict of the

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growing spirit of nationality, symbolized by the State, with the mediæval idea of the unity of the civilized world, expressed especially in the Catholicism of the visible Church. Secondly, it embodies the revolt of a laity increasing in wealth, education, and intelligence, against the control and privileges of a priesthood declining in enthusiasm, conviction, and moral fervor; and, as such, it may also be described as the religious aspect of the political advent of the middle classes. Thirdly, it is an assertion of individuality against a collectivist control over thought, opinion, and curiosity. These three ingredients are found in varying proportions in different countries. The second element was obvious everywhere, though it was weak in such countries as Spain and Poland, where a commercial class was almost non-existent. In Germany, where national unity had been shattered in the struggle for Empire, and where particularism ran riot in the absence of national control, national feeling, after a momentary explosion in the Hundred Years' War and a transient enthusiasm for Luther at the Diet of Worms, failed to concentrate in practical channels, and individual Protestantism held sway until it too became the state religion of territorial princes. In England all three elements were present, though individuality, or Protestantism, fought an unequal fight with the New Monarchy and toleration was beaten by an Established Church.

The spirit of nationality, of which the New Monarchy and the Established Church were the outward manifestations, had been stimulated by reaction against foreign influences in the 13th century, misdirected in the 14th toward the conquest of France, and dissipated in the 15th by civil broils. At length it found unity and direction under the Tudors, who frankly and firmly based their power upon new social forces. Feudalism, as represented by the great noble houses, was discredited and trampled under foot; political authority was taken from it and entrusted to lay or ecclesiastical ministers, who, like Wolsey, Cromwell, Cecil, Walsingham, were sprung from the upper or lower middle classes. Order at home and peace abroad were dictated by the interests of these commercial classes. Peace with money was Henry VII.'s ideal. Even Henry VIII. compressed the wars of a reign of 38 years into a few months, and insisted that they should not disturb trade relations with the Netherlands; and Elizabeth's wars were waged for piracy or self-defence. The age of chivalry was gone; wars, if waged at all, were waged with ledgers, not with lances. Men were made esquires and knights in the countinghouse and not on the field of battle.

For these struggles new kinds of brains were wanted, different from those which had designed mediæval castles or coats of arms. The day of the knight had passed away, and to him there succeeded the merchant, the manufacturer, the financial expert. These men were as yet unused to political responsibility: they needed training under the Tudors—and they got it. Under that dictatorship Parliament was moulded and developed as the instrument of government, and Parliament is the work of the Tudors to an extent which an age nurtured on

Parliamentary legends is unwilling to admit. Parliamentary privileges first became real in the 16th century; freedom of speech, freedom from arrest, and control of taxation are conceded, not because monarchy is weak, but because it recognizes that the people are its source of strength. Parliament is the foundation, not the rival, of Tudor power. It is true that in the interests of expediency and efficiency many a time-honored maxim is strained or broken; benevolences are levied, though benevolences had been declared illegal; but that is because benevolences, in the words of a Tudor statesman, "do not grieve the common people." Morton's Fork and Dudley's Mills were instruments of extortion, but the operation was not painful to the poor. Dukes and cardinals passed suddenly and swiftly from the palace to the prison, but the man in the street did not pass his time in palaces and generally escaped the prison. The success of a dynasty, whose tyranny has been so loudly denounced, is, in the absence of the usual supports of despotism—a standing army or a vast bureaucracy—only to be explained on the supposition that, while the vocal classes were offended, the dumb masses were content.

It was the work of Henry VII. to base the Tudor throne upon the interests of the commercial classes. His son appealed to national feeling against a universal Papacy and to lay impatience of ecclesiastical control. But he did not appreciate either grievance until Pope and Church crossed his personal will. The first half of his reign was a brilliant and somewhat tawdry pageant, staged by Wolsey with the effect, if not with the object, of diverting the king's and the nation's mind from more serious matters. In it England played the part of arbiter of Europe with a success due to the wealth left by Henry VII., to Wolsey's diplomatic skill, and to the evenly balanced rivalry between Charles V. and Francis I. But the pageant came to an end; wars and subsidies to foreign princes exhausted Henry's wealth (1522); Parliament refused to become the paymaster of Europe (1523); the balance between Charles and Francis was destroyed at Pavia (1525), and Wolsey's influence abroad collapsed. A domestic question intruded into Henry's notice. Catherine of Aragon was now (1527) beyond child-bearing, and her only issue was the Princess Mary. No Queen regnant had ever sat on the English throne, and it was popularly thought that they were disqualified. Henry VIII. had no brothers, and no nephews except the alien Scottish King, whose title as an alien might be barred at common law. A recrudescence of the struggle for the crown was feared, and various claimants had already been suggested. The prospect was horrible to a generation begotten in the civil wars; and as early as 1514 it was rumored at Rome that Henry would get a divorce because of Catherine's failure to present him with an heir to the throne and of the estrangement between England and Spain. But matters mended in this last respect, and the Princess Mary arrived on the scene; she gave promise of brothers, and Henry was satisfied for the time. But brothers never came, and the idea of a divorce revived. There were precedents enough in Henry's fam-

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ily circle; both husbands of his sister Mary had been released from inconvenient matrimonial ties, and his sister Margaret was no less favored by the Papacy. Henry's need was quite as great as theirs, his merits in his own eyes greater. Anne Boleyn doubtless added zest to the suit, but Henry's anxiety for a wife and not a mistress was due to the state of the succession.

He met with unexpected obstacles. Pavia had made not only Francis but also Clement VII. practically the prisoner of Catherine of Aragon's nephew. Charles cared little for his aunt, but it was a matter of vital importance to him that a princess who was half a Spaniard should sit on the English throne and secure England for the Spanish instead of the French alliance. His control over Clement would make a divorce harder for Henry VIII. than it had been for Louis XII., Henry IV. of Castile, Margaret, Queen of Scotland, or the Duke of Suffolk.

For a time, indeed, success seemed possible and near. France recovered from Pavia and sent an army into Italy. Charles's star seemed on the wane: Cement was freed and Campeggio was sent to England in 1528 with a commission ample for Henry's requirements. But appearances were deceptive; the French hope failed; Campeggio was ordered to do nothing except pass the time till the fortune of war should decide the divorce. In 1529 Italy became imperialist and Clement with it; Campeggio was recalled, and the case revoked to Rome. As Wolsey said, this meant not merely his own fall but the ruin of the Church in England. He alone stood for 15 years between it and its enemies. The Parliament of 1514 had anticipated some of the demands of 1529-36. The unpopularity of the Church alarmed ecclesiastics at that time, and men knew well enough that the Crown had only to abandon the Church for the Church to fall. Doctrine had little to do with this antipathy at first. It was the privileges, the perquisites and the power of the Church which excited discontent; not its ritual or its dogma. The laity were Catholic and they did not object to persecution; but they did object to persecution by priests; they wanted lay control of the penal machine, and they envied the wealth of the Church. In spite of theological appearances it was a commercial and utilitarian age which saw no advantage in vast endowments for contemplative monks or for non-reproductive purposes, and in holy-days on which men were precluded from the pursuit of wealth. There was moreover the sentimental grievance against Papal power which was the tool of a national enemy, and the growing spirit of nationality caused everything foreign, and especially a foreign jurisdiction, to be regarded with suspicion.

The first thing Henry did in 1529 was to turn out his ecclesiastical ministers, and put laymen into their places. This restored harmony between Parliament and the government; and although there were occasions on which Henry VIII. came into conflict with the Reformation Parliament and had to give way, both were bent for different reasons on "reforming" the Church in the sense of reducing its power. The foundation of that power was the Papacy, an institution beyond the reach of national control.

The Church in England could never be curbed so long as it drew support from an independent authority. Nor indeed could a reformation, in a more legitimate sense, be effected by any other means than the national state. General councils had failed; Popes had ceased to try; the acts of a national Church acting independently of the Papacy would be *ipso facto* void. Not a monastery could be dissolved without the Papal sanction; and Archbishop Warham said that he was merely commissary of the Pope, exercising as *legatus natus* a jurisdiction which he did not possess as primate. The national state was the only authority which could act independently of the Pope. The Reformation was therefore a revolution carried out by Acts of Parliament at the expense of the Church. By the successive acts of Annates, Appeals, and Supremacy the financial and jurisdictional rights of the Pope over the Church in England were transferred to the King; the Church was nationalized by the substitution of a national for a cosmopolitan head, and it became the Church of and not the Church in England.

Such a transformation was incompatible with the continued existence of the monastic orders. They were a negation of the national principle, being essentially international in government and in spirit. They had secured exemption from every sort of national control; and their immediate subjection to the Papacy caused them to be regarded as in a special sense the militia of the Pope. This was the ultimate cause of their dissolution, as opposed to their reform. The necessity for reform was admitted by a Papal commission in 1537, but Henry VIII. and Cromwell assumed the case for mending the monasteries to be a case for ending them. They were also useful as a gigantic bribe to induce the upper class laity to concur in Henry's measures and support them after his death; but this use of monastic endowments forbade their devotion to educational purposes, and from this point of view an unequalled opportunity in English history was sacrificed.

So far as doctrine was concerned, Henry VIII. made comparatively little change, though the denial of purgatory in 1536 cut deep at the root of the Catholic system and there were indications that the King was preparing for further changes in 1546-7. But the general impression was, as Hooper said, that the king had destroyed the Pope but not Popery; the doctrinal reformation was the work of Edward VI.'s ministers. Protector Somerset's changes were comparatively moderate and are represented by the first Act of Uniformity and the First Book of Common Prayer (1549). The latter especially was a compromise and its design was to open the door for the new learning without closing it upon the old. The definite breach with Catholicism came when Somerset had fallen as the result of his sympathies with the peasants in their protest against enclosures. Northumberland, who engineered the reaction against the Protector's liberal policy, played for the support of the extreme Protestants on whom alone he could rely in an attempt to exclude the Princess Mary from the throne. In 1552 by the Second Act of Uniformity and Second Book of Common Prayer the door was

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definitely shut on Catholicism; but so far as inspiration was sought from the continent and not from Wycliffe, that inspiration was Zwinglian and not Calvinistic. It was not till the Marian exiles returned from Geneva that Calvin began to exert an appreciable influence on the Church in England.

Northumberland's championship was enough to ruin any cause; and the identification of Protestantism with his harsh and violent role involved it in a discredit from which it was only redeemed by the blood of the Marian martyrs. Queen Mary came to the throne as a representative of the Tudor tradition against a self-seeking revolutionist; even her Spanish marriage was based on the approved policy of alliance with the House of Burgundy, and in religious matters few dreamed at first of anything more than a return to the system of Henry VIII. Wyatt's ill-advised rebellion, the truculent spirit of Mary herself, the character and conduct of many of the Reformers were responsible for the persecution which reached its height in 1555-6. It involved a gross miscalculation. Englishmen of that day were not squeamish, but no generation in England had witnessed anything like the burnings of Queen Mary. They rehabilitated instead of discrediting the Reformation; and the subsequent popularity of Foxe's 'Book of Martyrs,' with all its exaggerations, is proof of the impress of the persecution on the national mind. It was deepened by the association of this violent policy at home with weakness and disaster abroad. Tudor prestige depended largely upon the figure they cut in Europe, and Mary's well authenticated remark about Calais illustrates her appreciation of the failure of her policy. Her fate was hardly less tragic, though more deserved than her mother's.

Elizabeth personified the revolt from Rome, but not a Protestant or a Catholic theology. She was purely a *politique*, and if she ostentatiously kissed the Bible in the streets on her way to coronation, she was careful to show the crucifix in her private chapel to her brother-in-law's ambassador; and the ambiguity of the Ornaments Rubric had its value in international politics. That the late persecutions would cease was certain, but all the rest was made as doubtful as might be to the prying eyes of the foreigner. It was, however, largely a diplomatic pose adopted by the Queen, partly to parry a real danger and partly because it was of the essence of her nature to shirk responsibility. The wonderful unanimity with which the bishops refused to countenance Elizabeth and her ecclesiastical settlement shows that they were under no misapprehension. That settlement was no mere return to the Anglo-Catholicism of Henry VIII.; it did not go so far as the second Prayer Book of Edward, but it went a good deal farther than the first. Nor was repudiation of Catholicism so novel or so dangerous a thing as in Henry's reign. By the Peace of Augsburg (1555) the Empire had resigned itself to the public licensing of heresy. Calvinism was planted in the heart of Europe; the revolt of Scotland from the Papacy withdrew a thorn from England's side, and civil war in France placed another Catholic country *hors de combat*. Spain alone could think of a

Catholic Crusade, and Philip II. soon had enough to do with heretics and rebels in his own dominions. Elizabeth had more to fear from plots than from invasion, and her main task was to keep her subjects in a state of tolerable suspense until the financial and military weakness of the realm had been repaired. State and Church had become so closely interwoven that national unity was thought to require some sort of ecclesiastical uniformity. But it was to be one of externals principally; men must go to Church on Sundays, but Elizabeth boasted that she made no windows into men's souls. It was, however, impossible to avoid religious persecution when one religion involved a royal, and another a papal supremacy over both Church and State; and religious persecution went on in England until the Church practically abandoned politics and the State theology.

The plots against Elizabeth were, however, almost as much political as religious. The Bull of Deposition (1570) was a convenient screen; but even Philip II. did not launch his Armada until Mary Stuart had left him her claims to the English throne and Drake had goaded him into fury by attacks on Spanish trade. The northern Earls who rebelled in 1569 were fighting the fight of expiring feudalism as much as of the Counter-Reformation; nor is it easy to believe that the Catholic religion was the sole concern of the Queen who married the Protestant Bothwell according to Protestant rites. The political chessboard was divided into national and religious squares, and the moves were often complex; for while the bishops were supposed to keep to their own color, the rival Queens and their knights might move on either. From the dynastic point of view Elizabeth was handicapped. Precluded from matrimony by a physical defect, she had to leave the succession to look after itself, and makeshift with suitors. She prolonged this game almost beyond the limits of public decency; but it was done with inimitable skill and gave England an invaluable breathing space of 30 years. At length the success of Parma in consolidating his power in the Southern Netherlands (1580-84) and the stroke of fortune which gave Philip the crown of Portugal with its colonial empire, its harbors and its navy (1580) induced him to make a bid for the title of which the death of Mary Tudor had deprived him, and the death of Mary Stuart had left him heir. It was a forlorn hope from the first. Philip's failure in the Netherlands might have warned him of the odds against him under circumstances far less favorable. There is no reason to suppose that Philip would have been successful even if the Armada had disgorged its hosts on English shores. Drake and his colleagues saved England not from conquest but from a bloody and perhaps a long drawn struggle fought on English soil.

With the defeat of the Armada the work of the Tudors was done. Their dictatorship was the result of an emergency at first domestic and then foreign. So long as the danger lasted of internal disruption or external attack, Englishmen acquiesced in the despotic maxims of *droit administratif* and Roman civil law. The people supported arbitrary government to avoid

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a greater ill; but with the danger there passed the need and the inclination to subordinate self-government to national security. Elizabeth lingered a few more years on the stage, but she was losing touch with her people. Her waywardness, as Parliament told James I., was only tolerated because of her age and her sex, and the Commons were girding themselves for their hundred years' war with the Crown.

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6. Great Britain—English History of the 17th Century. The intensely dramatic nature of the events of the political life of England in the 17th century has led every English and American historian to attribute to the period an exaggerated importance. The generally accepted view held by these historians is that the Stuarts attempted to perpetuate or to live up to the pure type of Tudor despotism, and that partly because of their want of personal popularity, and partly because of the silent growth of national self-consciousness, the attempt was a failure; and that as a consequence the century witnessed the definitive overthrow of the Tudor system of paternal despotism—an overthrow in which the chief operating factor was the Great Rebellion.

Such a view involves a serious misconception of the real nature of the problem which the century had to solve and at the same time a still more serious misconception of the actual constitutional advance which that century achieved.

The real problem which the century had to solve was not the setting up of one ideal of State or government upon the ruins of another ideal. History does not concern itself with ideals. It concerns itself with men and things—men who are flesh and blood and intensely practical, and things which are more sternly practical still—such things as, when they mount the saddle, ride mankind. The real problem of the century was how to bridge over the gulf between the executive and the legislative.

Under Elizabeth the central power from which the whole executive machinery radiated was the Privy Council. That body was simply a small permanent Council of Government or Council of State. With the sovereign at its head, it was the government. The whole executive administration of the country rested upon it. Without dividing itself up into committees at all, but simply sitting together as a single and permanent body, this Council decided each and every question of administration, whether relating to the land forces, the calling out of the militia, their equipment, and the whole plan of any military operations, or to the naval forces, including the arranging of transport, the making of contracts with the victualler, and the stragetical distribution of men and ships, or again to diplomacy, including every species of confidential letters and instructions to ambassadors and agents abroad, or again to finance, including especially a most strict control of issues out of the exchequer, or finally to every branch of internal administration and law, the main channel of communication in this last instance being the justices of the peace in the counties.

Where does the Parliament, England's glory, come in in such an enumeration? The answer is simple. It finds no place whatever in it. And if Elizabeth, to take her for the moment as the type, had been able to live off her own, as the kings of England were then supposed to do, never a word would have been heard of a Parliament. So long as it could pay its way the executive was efficient and sufficient without the Parliament. During the 44 years that Elizabeth reigned she called 13 Parliaments at irregular periods but with an average interval between each of more than three years. These Parliaments sat as a rule about two months. The total aggregate period of session of the whole 13 Parliaments was less than 34 months. So that out of the whole 44 years of her reign the Privy Council or executive had uncontrolled management of the nation for nearly 42 years. Nor would it be correct to say that during the remaining two and a half years the executive was confronted by the Parliament. That body was called simply for the purpose of supplying the government with money. Having dutifully voted its tenths and fifteenths it was allowed to legislate on non-contentious matters and was then dissolved. In the whole of the statutes of Elizabeth's reign there is not one of any constitutional importance. More than this, not the slightest attempt was ever made by the legisla-

tive to extort from the executive an account of the expenditure of the money thus granted by the Parliament. Once the subsidies were voted there was an end of the matter as far as the two Houses were concerned.

After James I. came to the throne this docile attitude of the Parliament to the executive gradually changed. The important point about this change of attitude is not the cause which brought it about, but the form it took, the way in which it expressed itself. That expression is focussed for us in the terms of the Great Contract, the failure of which led to the dissolution of James's first Parliament in 1610. In this bargain of the Great Contract James's position was comparatively simple. In the first year of his reign the Parliament had granted him for life the subsidy of tonnage and poundage. That grant practically put him in the same position financially which Elizabeth had been in throughout her reign. His revenue (from Crown Lands, royalties, casualties, and customs) was his own. He was expected to live on it, and by that phrase was meant that out of his own he should provide for the whole government of the country — regal, legal, civil, military, and naval. If debts arose or extraordinary occasions demanded, he would have to ask for extra grants of tenths and fifteenths just as Elizabeth had been obliged to do. These extra grants Parliament never refused to the Virgin Queen; nor did James's first Parliament refuse them to him. But James tried for something more than this. He tried to get an increase of "his own," of his life revenue, that standing, permanent, ordinary revenue out of which he had to defray the ordinary expenditure of the State. Nor was the Parliament indisposed to meet him. It accepted the general principle of his demand, and agreed tentatively to increase his life revenue by £100,000 a year on certain conditions. These conditions embodied the Parliament's demands on the subject of their grievances, the Impositions, such oppressive royalties as purveyance, and certain ecclesiastical complaints.

Stretch or construe these points as we will we shall not find in them anything in the nature of a challenge from the legislative to the executive. All the points which the Commons demanded were to be conceded by the Crown as a matter of bargain. They were to be voluntary sacrifices of prerogative on the part of the king in return for so much cash. When carried out, the executive was still as before to occupy the whole governmental field alone. No part whatever of that field was it for a moment in the Parliament's mind to itself occupy or usurp. It never dreamed of demanding some control over the executive, or even the slightest share in it, either by requesting to be consulted in affairs of State, or by claiming the appointment of any of the king's ministers. The executive was the king's, the ministers were the king's, his completely and his alone, and Parliament never once thought of challenging such a flower of the prerogative. Had the Great Contract gone through the only difference would have been that for the future the king's executive would have agreed to avoid certain acts or to cease the exercise of certain rights of prerogative which had been felt as a grievance. For the rest the executive

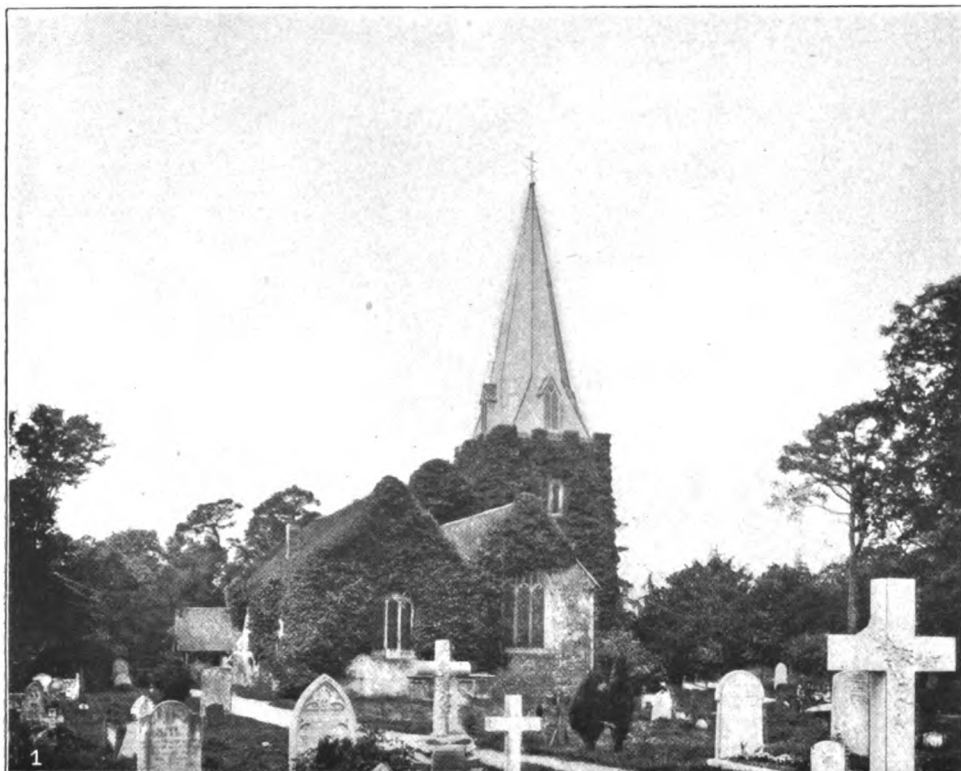
would have been stronger, not weaker, by the compact, for it would have been better able to pay its way, and so to avoid frequent appeals to the Commons.

Equally noticeable with the subject-matter of the Great Contract was its form. The negotiation was carried on as if it were a treaty between two foreign and totally unrelated powers. The want of connection between the two parties to it could not have been more complete if the king had belonged to one country and the Parliament to another. And between these two parties, the executive and the legislative, the Crown and the Parliament, there was not even a regular and recognized channel of communication. Practically the only means of intercourse was a direct message or speech from the king on the one hand or a petition from the Commons on the other. For the rest all was haphazard. Such members of the executive as sat in the House acted individually each as he thought fit, or as he was bidden, in promoting the king's business. On its side the Court party or the executive had no more thought of creating and working some piece of machinery by which the king's business could be piloted smoothly through the House than the House had on its side of ever challenging a share in the executive. There was a gulf between the two which neither side dreamed of permanently bridging over. On neither side did the slightest conception exist of a Constitution in which the executive and the legislative should be linked together.

It was the problem of the 17th century first of all to perceive the necessity of such a link, and then to invent the mechanism. If this statement is a correct diagnosis of the true bearing of English 17th century history, then the constitutional importance which has hitherto been attributed to that history will be found to be exaggerated. For the simple fact remains that the clear perception of the need was only attained at the close of that century, and the mechanism itself was only gradually elaborated in the 18th century.

Fortunately or unfortunately the Great Contract broke down, and from that moment commenced that antagonism between Crown and Parliament which was destined to produce the Great Rebellion. The steps by which that antagonism developed itself until it blazed out in open war need not be detailed here. They are the commonplaces of history. The point to notice is that the moment the antagonism emerged the opposition of Parliament to executive, or of nation to Crown became not so much constitutional as political. What is the distinction between these two terms? The difference is fundamental, for whilst the one is a matter of principle and abiding, the other is a thing of time and place, and may be transitory. Had the nation said to James through Parliament as its mouthpiece, "You represent and wish to perpetuate the Tudor type of government by prerogative; we have outgrown that and claim for ourselves a share in the government," such an attitude would have been constitutional. But nothing of the kind was either said or thought of. The opposition which developed itself was conditioned in its form by the mere force of circumstance. When, after ten years of rule without

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1. Churchyard of Stoke-Pogis, England.
2. Ann Hathaway's Cottage, Stratford-on-Avon, England.

Univ. Library, UC Santa Cruz 2001

a Parliament, James in 1621 summoned his third Parliament, there were reasonable prospects of a complete agreement. The House, glowing with Protestant fervor, made not the slightest reference to the old burning question of impositions. It sat down at once to consider supply for the support of a war in defense of the Palatinate. For the first fortnight of the session James could have done anything he pleased with the Commons. Ten months later, in December 1621, after with his own hands tearing out of the journals the Protestation of the Commons, the king dissolved the Parliament in anger and sent three of its members to prison. How could so complete a change have happened? The answer is simple. The Constitution provided no mechanism by which James could explain to the Parliament his foreign policy. He could not, nor would he if he could, take the whole House into his confidence, and he never thought, any more than did the House itself, of such a device as that of taking a select few of the leaders of the Commons into his counsels. Nothing is more remarkable in this Parliament than the scrupulous regard which the House paid to the king's prerogative in the matter of foreign affairs. It was for the king, and the king alone, to make treaties and to decide peace or war, nor could they press him to disclose his policy. Had the Commons felt as certain of the patriotic and Protestant trend of James's foreign policy as the Parliament of Elizabeth's days had been of her foreign policy, not a word of criticism or contention would have been heard. But they were not so certain, and as a consequence felt that they were being called upon to vote supply for a policy which might even be the very opposite of that which the nation yearned for. Then a side issue arose. In his impatience at the slightest doubt being cast upon his foreign policy James was led to assert his view of the prerogative in so dogmatic a way as practically to deny free speech to the House. To this the House of Commons replied by the Protestation, in which they claimed practically nothing but the parliamentary privilege of freedom of speech, just as it had claimed it in Elizabeth's day. This, and this alone, was the cause of the breach.

Will any one contend that there is anything of constitutional principle in this? If the Parliament had said "We demand to know what your foreign policy is, and that it is in accordance with our views before we vote supply" there would have been constitutional principle involved. But over and over again the Commons disclaimed any such idea. If James was antiquated in his devotion to the Tudor ideal of prerogative the Parliament was just as antiquated as he in their devotion to it, for they distinctly admitted his view, and when they joined issue with him it was on the minor point and on the lower plane of parliamentary privilege.

A remarkable change, however, though transitory as it proved, came over the scene as James's reign came to a close. For some unexplained reason his powers decayed whilst he was still young, for he died at the early age of 57. Whether it was due to this premature decay, or to his own intense chagrin at the failure of his long negotiation with Spain, we cannot say.

But certain it is that for the last two years of his reign he was a mere tool in the hands of Buckingham. Had it not been for this senility it is certain that the astounding constitutional departure which marked the career of his last Parliament would never have been enacted. James met that Parliament with the practical confession that his foreign policy had been a failure, and he invited their co-operation in the evolving of a policy to take its place. He informed the Houses that his secretaries would tell them the whole story of the marriage treaty with Spain. After they had heard the story, he continued "I shall entreat your good and sound advice. . . . I assure you you may freely advise me, seeing of my princely fidelity you are invited thereto."

The marvellous thing about this sudden and revolutionary surrender of prerogative by James is that it sprang from the dictates of Buckingham. But more extraordinary still was the sequel. Following the dictates of the imperious favorite as tamely as a sheep, James, after receiving the advice of both Houses, informed them that if they made him a grant for a war they might appoint their own treasurers to see to the spending of the money, and further "I promise you on the word of a king that although war and peace be the peculiar prerogative of kings, yet as I have advised with you in the treaties on which war may ensue, so I will not treat nor accept of a peace without first acquainting you with it and having your advice." (8 March 1623-24.)

Accordingly when twelve days later the Commons voted three subsidies and three fifteenths the money was ordered to be paid to treasurers appointed by Parliament and not into the Exchequer: and at the same time the Houses in an address to the king plainly laid down the object for which the money was voted.

In the whole course of 17th century history, including the civil war and regicide, there is no more revolutionary incident than this complete, sudden, uninvited surrender of prerogative on the part of James. Had it happened as the result of deliberate thought, and whilst James was still in his prime, it would have shortened by more than a century the birth throes of modern constitutionalism, and have saved the Stuarts from exile.

But it did not so happen. It was a momentary inspiration of Buckingham's, the genesis of which is to be explained by the favorite's own personal position and policy at the time, and it was by him forced upon the feeble king with an impetuosity that swept everything before it. But as with all Buckingham's inspirations, it was no more than a flash and almost as soon over. After the old king's death the versatile but unstable minister made one or two disingenuous efforts to revert to such relations with the Commons. Though the mouth of his creature, Sir John Coke, he submitted to Parliament in July 1625 a rough statement of the expenditure of the subsidies granted in 1624 and again in the following month of August 1625, when the Parliament was sitting at Oxford because of the plague, the lord treasurer made a similar statement. But further than this the concession was not carried. From the position which James had adopted in 1624 Charles grad-

ually receded, not so much from deliberate design as from the mere force of circumstance and from a growing perception of the revolutionary consequences which that position entailed. The desire on the part of the Commons to inquire into the expenditure of the subsidies led them to utter their opinions on the merits of Charles's foreign policy, and in particular to call into question the advice given to the king by the Council of War as to that expenditure. The moment this was clear to Charles any further surrender of prerogative was impossible. Backed by the king the members of the Council of War refused to reply to the interrogatories of the Commons. Their resistance proved successful. Before the determined attitude which Charles thus took up the House quietly receded and dropped any further attempt at pressing the interrogatories. (March 1626.)

With this incident practically ended the whole two years' episode of attempting to take the Parliament into partnership with the executive by means of a voluntary and undefined surrender of prerogative. Had the king allowed the members of the Council of War to answer the interrogatories of the House the principle of ministerial responsibility (that is, the responsibility of the executive to the Parliament, and not to the king alone) would have stood forth in abrupt nakedness. When Charles resisted that demand the emergence of such a principle was postponed for a century. For be it borne in mind, the impeachment of Buckingham, and the later proceedings against Strafford, Clarendon, and Danby never advanced the enunciation of that principle a jot. The mere punishment of a minister great or small does not imply ministerial responsibility in our sense of the phrase. All through the 17th century the ministers were the king's servants and were responsible to him, their master, alone. After the exile of Clarendon the Commons did not demand to be consulted as to the choice of his successor, or as to the policy of his successor. Charles had simply sacrificed one of his servants. That was all. Then he engaged another servant to do exactly the same things, and went on as gay and unconcerned as before.

But had the episode of 1624-26 ended differently the acceptance of the principle of the responsibility of ministers to Parliament as well as to Crown would have led inevitably to the forging of some such link between the executive and the legislative as only came generations later. From the moment such a link had been forged questions of adequate supply for the services and of a proper audit, and again questions of the personal liberty of the subject, of habeas corpus, and what not, would have solved themselves harmoniously. For the participation of the Parliament in the executive would have insensibly tinged the spirit of the whole administration of the country. As compared with the evolution of such a principle the Petition of Right, habeas corpus, nay, even the Revolution itself, are minor incidents.

Such I take to be the true constitutional bearing of 17th century history.

The remainder of the reign of Charles I. when he ruled without a Parliament, the outbreak of the Civil War, and the consequent

military despotism of Cromwell are devoid of constitutional significance. The rule of Oliver Cromwell was a despotism as pure as that of the Tudors, the only difference being that the prerogative of the Crown, which had formed the ultimate sanction of the executive government of James I. and Charles I. was replaced by the naked power of the sword. The quarrels between Oliver and his Parliaments were in substance and essence the same which had been fought between Charles and his Parliaments. They one and all turned upon the question as to whether and how far the Parliament, the legislative, should thrust itself into the domain of the executive, notably, of course, but not solely, in the matter of the command of the forces. To any such demand Oliver's reply was a much more peremptory, indignant, instantaneous *non possumus* than ever James or Charles could have uttered. And when the sword fell from his dying grasp and the succeeding anarchy swept away the chances alike of his dynasty and of pure republicanism, the Great Rebellion had become a mere tale that is told. When Charles II. returned at the Restoration in 1660 the Stuart dynasty reassumed the inheritance of an undiminished prerogative, one that is in no whit distinguishable from the prerogative wielded by Elizabeth, James I., or Charles I. He was granted a revenue for life which might, had it been fully realized and carefully husbanded, have made him independent of the Parliament. He was left in uncontrolled possession of the executive. His ministers were his own, nominated by him and responsible alone to him. His revenue was his own, to spend as he pleased, without the slightest restriction in the way of appropriation. His foreign policy was his own, he could make war or peace or treaty unquestioned, and as he chose. Had it not been for the outbreak of the Dutch War it is probable that his reign would have witnessed no parliamentary incursion upon his prerogative. As it was, when under the strain of the shame caused by the first Dutch War the Parliament did actually make an incursion into the domain of the executive, the novel departure took exactly the same form which it had taken in 1624 under James I. No more speaking comment than this could be passed upon the fruitlessness and futility of the intervening period of civil war, regicide and revolution.

The full story of the episode in question is too long to be given here. It has been treated fully in the introduction of the second volume of the 'Calendar of Treasury Books.' In brief, what happened was this: With the full consent of the executive (Charles himself) the Parliament in voting supply for the Dutch War appropriated that supply specifically to that war. The necessary corollary was that a few months afterward the Commons were driven to demand an account of the expenditure of that supply. Had the war been successful there would have been no boggling over such an account. But the war had not been successful. It had brought with it disaster and humiliation, and men's minds were correspondingly inflamed. But even so, the action of the Commons was astonishingly mild. Although the inquiry might have led the Commons to cover the whole field of administration and to question the whole conduct

of the executive during the war, the Parliament practically in the end restricted its attention to the question of the auditing of the accounts. Charles at first resisted the proposal as a breach on his prerogative; but in the finish, with his usual subtle adroitness, he gave way.

The immediate outcome of the inquiry was in great measure the exoneration of the executive from the suspicion of financial dishonesty. But the immediate result is insignificant by the side of the ultimate results. On the one hand it furnished a now unchallengeable precedent for appropriation of supply and for audit of accounts; and once the right of auditing accounts should be fully conceded, the further right of questioning the conduct and policy of the executive was bound to follow. Once that consequence was fully established the gulf which sundered the (king's) executive from the (people's) Parliament was narrowing and a bridge was being built over it. The Parliament was coming to identify its interests with those of the executive instead of maintaining an attitude of permanent aloofness or even hostility. Of the two parties to this conversion the Parliament itself was slower of comprehension and more unwilling of movement than the Crown. For to identify itself with the administration was to forfeit all the vantage ground of complaint and agitation on which it had stood in the past. Accordingly the change did not actually accomplish itself in Charles II.'s time. For the rest of his reign the parliamentary opposition was swayed by motives which were merely and purely factious. But as the century drew to a close the gulf was in great measure bridged over, and in the course of the 18th century the new structure was perfected. The executive ceased to be the personal property, appanage, officialdom of the king. It became identified with the parliamentary system through the device of parliamentary departmental heads; and the practice of annual estimates took the responsibility for the financial administration of the country from the shoulders of the king, and laid it upon the broader shoulders of the Parliament. From that moment the development of English constitutional and political life has been smooth and harmonious.

But these ultimate results lay unfolded in the bosom of the future. To Charles II. the Commission of Accounts taught another and quite different lesson. It taught him the art of parliamentary management, not merely how to buy off the opposition, but also how to organize his own friends in the House. Danby's corrupt leadership of the Parliament, and the various devices employed to influence the constituencies on the one hand, and Sir William Temple's scheme of a reorganization of the Privy Council on the other, are but manifestations of this side of Charles's statecraft. Thanks to this statecraft of parliamentary management, Charles remained easily master of the situation for the rest of his reign, and when he died he left to his brother a prerogative as unimpaired as that which James I. had wielded—complete control of the executive at home, complete control of the forces, complete control of the foreign policy of the nation.

From the point of view which has been thus expounded, what was the historical significance

of the Revolution of 1688? In a sentence it lies not so much in the direct challenging of prerogative as in the quiet, undefined, unobserved usurpation of it by the Parliament. In the first place the Parliament voted a standing revenue of £1,200,000 for the support of the Crown in the time of peace. This was exactly the sum which the Restoration Parliament had granted Charles II. in 1660. But whereas in 1660 that sum was meant to cover the complete national expenditure, civil and military alike, the details and management of which were left absolutely unchallenged in Charles's hands, the vote in 1689 was intended only for the civil establishment in time of peace. Immediately after this vote the Parliament proceeded to consider the question of separate supply for the army, navy, and ordnance, and in order thereto detailed estimates of the charge of the army and navy were laid before the House.

Herein lies the Great Revolution—not in the clauses of the Bill of Rights. For the moment the Parliament realized that the provision for and regulation of the army and navy was its province it had assumed to itself half the domain of that kingly prerogative which had endured through Tudor and Stuart times. It had stepped over the gulf which had hitherto divided the domain of the executive from that of the legislative. Once this first step had been taken, there remained only the problem of evolving the machinery by which the participation of the Parliament in the executive should be expressed and regulated. The course of the evolution of that machinery—the selection by the Crown of its advisers and administrative departmental heads from the chiefs of the parties in the Parliament—was determined by the mere force of circumstance, that is, by the situation in which William III., and again, a generation later, George I., each found himself as the imported ruler of a strange country. The gradual development of the party system of government afforded the key to the solution of the problem of which the 17th century had been so long in labor. For when once the obvious step had been taken of selecting the party chiefs as the heads of the various executive departments, the development of the system of Cabinet government was bound to follow sooner or later. But even so, generations had still to elapse before this new parliamentary executive fully grasped the control of that last and most highly-prized flower of the kingly prerogative, the direction of the foreign policy of the country.

So far as these results depended upon the mere accidents of the Revolution of 1688 and of the Hanoverian Succession they may be regarded as, in a sense, fortuitous. If it is true that England has blundered into an empire, much more true is it that she has blundered into a Constitution.

If the ordinarily accepted view of the constitutional importance of our 17th century history is wide of the mark and distorted, much more truly may this be said of the ordinary view as to the religious history of that period.

The chief outstanding features of that religious history are, firstly, the absolutely unreasoning fear of a Catholic reaction, and, secondly, the temporary exaltation of Puritanism.

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The two are by no means synonymous. For whereas the jealous fear of Catholicism was national, pervading the country blindly from end to end, the triumphant emergence of Puritanism was local, partial, temporary. But if the two are not synonymous they have been alike in their fate. With the inscrutable irony of her passionless lips the Muse of History has consigned them both to the region of human futilities. The further we are drifted from the 17th century by the stream of time the more difficult does it become to us to realize the standpoint of that century on the question of the Catholic reaction. We can see now that whatever form that attempted reaction took, whether it be of the theological discussions which waged in the presence of James I. as the divines flocked round his chair, or of Laud's unattainable conception of an unifying Catholicity, or again of Charles II.'s cynical but more statesmanlike conception of Indulgence, or finally of James II.'s grossly bigoted intrigue, in one and all of these or any other forms the movement was doomed to failure before its birth. The panic, the absolutely unreasoning fear, the blinded and relentless fury which seized the nation again and again throughout the period and which not only accounted largely for the rebellion of 1642 and the revolution of 1688, but also left their malignant trail on two centuries of our later history, fill us to-day with only a sense of disdainful surprise.

As for Puritanism, the second religious phenomenon of the century, the judgment of our own day has been more sympathetic, partly because it has been the fashion since Carlyle's day to speak of it in terms of respect, and partly because the movement has not yet lost its force in English and American life. But be it borne in mind, in the 17th century Puritanism in its day of power did not show itself a constructive force either in the domain of dogma or in the domain of ecclesiasticism. The dogmatic wrangles of the Westminster Assembly—the discussions as to the method of the imputation of Christ's righteousness and what not else—are utterly meaningless to us. And when Puritanism was called upon to solve the problem of the erection of a national church it completely failed. In the mere interests of human tolerance Cromwell, himself a Puritan of the Puritans, was forced to take the problem out of the hands of his co-religionists and thereby to dash to the ground their half-finished and futile structure. And will anyone contend that either in its persecuted birth or in its day of exaltation, when for a brief span it wielded the wooden sword, or again in its day of adversity when at the Restoration 2,000 of its ministers left the national church to wander in the by-ways of Separatist Dissent, that in any one of these its forms Puritanism was ever a missionary movement or a missionary church in the sense in which 18th century Methodism was a missionary movement? Such contention could not be maintained. The basis of Puritanism was dogmatic and clerical throughout; the fervor of humanity never breathed into it a spark of missionary fire. Its zeal was spent in the dogmatic defense of forms of church government, in the safe-guarding of the church membership of each little community. To the

nobler issues of life, to the higher conception of toleration, of humanity, of national religion it was, and throughout the succeeding century it remained, cold and dead.

Bibliography.—The original authorities for 17th century English history consist of:

1. Parliamentary records: the 'Lords Journal' and 'Commons Journals' which are in print; and much material still in manuscript at the House of Lords, but which is being gradually printed by the Historical Manuscript Commission. The only full edition of the Acts of Parliament is the 'Statutes of the Realm,' but this collection does not contain the Commonwealth Acts and Ordinances. These latter can only be obtained from the collections of Husband and Scobell, and from the separately printed ordinances.

2. The archives in the Public Record Office: comprising mainly (a) Domestic State Papers calendared up to 1675 and from 1689-93. (b) Foreign State Papers, not calendared at all for the 17th century. (c) Colonial papers, only partially calendared. (d) Certain departmental archives, and Commonwealth Committee archives, only partially calendared as yet. Of the departmental archives the Treasury Records are the only ones at present being calendared; similarly the printing of the 'Register of the Privy Council' has not yet reached the 17th century.

3. Archives not preserved at the Public Record Office, viz.: (a) Collections of manuscripts and individual manuscripts at the British Museum, at the Bodleian (including the Clarendon manuscripts, Carte manuscripts, and Tanner manuscripts), and at Lambeth (including the Commonwealth Church Manuscripts). So far as these sources have been worked at all it has only been by individual effort or by societies such as the Camden. Of the manuscripts printed by the Camden Society, the 'Clarke Papers,' 'Nicholas Papers,' and 'Lauderdale Papers' may be particularly instanced. (b) The archives in the possession of private families are being systematically printed by the Historical Manuscripts Commission. So many of the reports bear on the 17th century that it is almost impossible to particularize, but the 'Buccleuch manuscripts,' 'Portland manuscripts,' 'Ormonde manuscripts,' 'Cowper manuscripts,' 'Rutland manuscripts,' 'Fleming manuscripts,' 'Stuart manuscripts,' and 'Kenyon manuscripts' may be specially instanced.

4. Printed collections of state papers, viz.: Winwood, Sydney, Roe, Wentworth, Rushworth, Nalson, Thurloe, Milton, Clarendon, Orrery, Macpherson, Hardwicke, Rochester, Carstairs, Kemble, and Stuart Papers.

5. Diaries, memoirs, etc., other than those published by the Camden Society and other societies, viz.: Whitlock, Burton, Ludlow, Holles, Fairfax, Hutchinson, Price, Herbert, Reresby, Warwick, Berkley, Evelyn, Pepys, Anchitell Grey, Luttrell, Ellis Letters.

6. Constructive synoptic works: Rapin, and Tindal, Baker, Clarendon's 'History' and 'Life,' Carte's 'Ormond,' Kennett's 'Register' and 'History,' Burnet's 'Own Time,' Andrew Marvell's works, Sir William Temple's works, Boyer, Ralph and Dalrymple.

7. Of tract literature the mass is so great

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that the portions which have been printed in the 'Cabala,' 'Harleian Miscellany,' 'Somers' Tracts,' 'State Tracts of Charles II.,' and 'State Tracts of William III.,' are an inconsiderable fragment of the whole.

8. Of modern constructive historical work the only English one worthy of the name is S. R. Gardner's great work covering the years 1603-54. Carlyle's 'Cromwell' is a constructive work of distorted view; Macauley's history for the later part of the century represents a type of historical writing which is deservedly falling into disrepute among professional historians. Ranke's 'History of England,' and Doctor Ono Klopp's work on the fall of the House of Stuart are scientific and exhaustive. For Church History, Shaw's 'History of the Commonwealth Church' is a specialized work covering only the years 1640-60. The various denominations of the Dissenting Churches, as also the Quakers have an abundant historical literature of their own, but, generally speaking, neither the religious history of the century as a whole, nor the intensely important and interesting economic history of the century have as yet received adequate specialized attention, though Doctor Cunningham has covered many aspects and much of the ground of the latter section in his 'Growth of English History and Commerce.'

WILLIAM A. SHAW,
Author of 'The History of the Church Under the Commonwealth; 'The Knights of England,' Editor of the 'Calendar of Treasury Records' at H. M. Record Office, etc.

7. (a). **Great Britain — Eighteenth Century. Historical Sketch.**—The 17th century had settled two very important questions. It had been finally decided in 1689 that the government was to be carried on in accordance with the will of the House of Commons and that there should be freedom for both religious and political opinion outside Parliament. The questions of taxation without consent of Parliament and of the state control of religion, which had convulsed the 17th century, were no longer all-absorbing, and the 18th century found an outlet for its energies in new directions. It is therefore the century of great economic advance, of commercial wars, of the expansion of trade, of the growth of colonies, culminating toward the end in the transformation of the whole rural and industrial life of the country.

The leading features of the period from 1702 to 1815 are those connected with the rule of the great Whig aristocracy in Parliament, the expansion of England abroad in spite of the opposition of France, the consolidation of the Britannic state at home and the change of the whole character of the country by the coming of machinery. See GREAT BRITAIN — INDUSTRIAL REVOLUTION.

The great constitutional fact of the 18th century is that the era of the responsibility of the monarch for the welfare of the nation had passed away for ever. William III. had been called to the throne by Parliament and it was on Parliament that he depended for his support. In 1702 the Crown was vested by an Act of Parliament in the Electress Sophia of Hanover and her Protestant descendants, and the first

two Georges happened to be men who were thoroughly German and so left English affairs to the English Parliament. Hence the predominance of the House of Commons became firmly established. It was found convenient that a group of ministers should form a committee to carry on the affairs of the nation. Gradually it became the rule for them to be chosen from the party which had the majority in the House of Commons and to vote under the leadership of one man. The delegation of monarchy to the Prime Minister and the Cabinet was accomplished by the end of the 18th Century. See GREAT BRITAIN — CROWN AND CABINET.

The Revolution of 1689 had split the country into two great parties—the Whigs and the Tories. The Whigs, who were the active commercial party, were in favor of a Protestant succession and toleration in matters of religion. As they believed in a Parliamentary King as opposed to a King by Divine Right they were bound to reduce the power of the monarchy but to support the existing line which they themselves had chosen. The Tories had to choose in 1689 between their religion and their King. If they supported the King they would destroy the Established Church and set up the Roman Catholic Church. Hence they decided against the King and joined the Whigs to get rid of the Stuarts. Then they repented, especially when they found that the Whigs obtained all the emoluments of office, and to restore themselves to power they looked to France and the descendants of James II. who had French support. Meanwhile they were quite willing to join the Whigs in depriving the Hanoverians of as much power as possible and so we see both parties disposed to lessen the power of the Crown. It was not until the reign of George III. that the Tories became reconciled to and supported the King *de facto*. The Whigs were the great war party because they were anti-French; the Tories were the peace party since in France lay their hopes of getting back their own King.

In the reigns of William III. and Anne the monarch was still able to hold the balance between the two parties. Under the first two Georges the Crown could only exercise its power by means of great Ministers, notably Sir Robert Walpole. George III. determined to throw off the yoke of Parliament and was successful in bringing in the Tories under Lord North in 1770, but even so popular and determined a King as George III. found it impossible to carry on the Government except through Pitt. The power of the Crown was still further weakened during the period of mental incapacity of the monarch and by the incompetence of his immediate successors.

During the 18th century it was gradually found advisable in the interests of the despatch of business that the King should choose his ministers from that party which had a majority in the House of Commons. In 1696 a party ministry had been formed, but the lesson was only slowly learned that the Ministry must depend on the state of parties in the Lower House. In the time of William and Anne composite ministries were the rule. Under George I. and George II. there was a constant Whig majority in the Commons and a Whig Ministry in power. In 1784, however, George III. was

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successful in keeping Pitt in power notwithstanding an adverse majority in the Lower House. But the King only anticipated the decision of the country, for at the next election a House was returned which supported Pitt, and from that time the Prime Minister and the Cabinet have always been chosen from the predominant party.

Thus, monarchy, as it "withered on the throne took root in the Cabinet." The Parliamentary Government of the 18th century was however by no means government by the people. It was government by the great aristocratic families, tempered by deference to public opinion. It was not till the electoral reforms of the 19th century that the democracy became predominant. The great era of English expansion and the command of sea power were attained under an aristocracy and not under a democracy.

The question of English colonial expansion during this period centres round the long struggle with the French. The most profitable line of trade in the world was considered to be that of the Spanish colonies and the adjacent islands, and with these England drove a considerable contraband traffic. On the other side of the world there were the riches of the East and the wealth of the Spice Islands. It seemed probable in 1701 that France, the great commercial rival of England, would inherit the throne of Spain, drive out the English from the Spanish Main and dominate that trade. Hence England's intervention in the War of the Spanish Succession. By a series of brilliant battles won by the Duke of Marlborough between 1704 and 1709 she attained her object, for by the Treaty of Utrecht (1713) England gained Gibraltar, Port Mahon, Nova Scotia, and Newfoundland; while the rights of the Hudson's Bay Company in their vast territory were definitely recognized. England had secured a base from which to operate against the French, and at the same time by the Assiento Contract (see GREAT BRITAIN — EIGHTEENTH CENTURY COMMERCE) she won a share in the monopoly of Spain in America and prevented it being closed to her by France. The war left Holland and France financially exhausted. The Dutch trade began to fall behind. France was heaping up financial burdens which were to lead to national bankruptcy. England alone was in a position adequately to maintain a navy and the command of the sea. She thus became the foremost sea power and secured her trade supremacy in one of the most important quarters of the globe. An attempt to interfere with it led to the war with Spain in 1739, which merged into the war of the Austrian Succession ending in 1748.

In another direction, however, that trade supremacy was being threatened. In India a French and an English East India Company each had trading factories or settlements, the English posts being Bombay, Madras, and Calcutta. They were not subject to the English Government, but were under the Company, and England had no governmental responsibility whatever in the matter.

In India there prevailed, about the middle of the 18th century, a wild anarchy due to the break-up of the Mogul Empire in 1707, and

military adventurers were beginning to make themselves supreme in various parts. The French governor of Pondicherry, Dupleix, a man of great military genius, began to perceive that it was quite possible for Europeans to gain predominance in the general scramble; and by supporting various native rulers and organizing native troops on the European model he soon made himself one of the chief powers in India. If the English were not to be ousted altogether they too had to organize. Clive copied the French policy so successfully that English influence became predominant, and the future of India fell into the hands of the English. The French settlements were restored, but they were no longer military establishments, and France was reduced to relative unimportance. In 1784 the English government became responsible for the administration of India, while the East India Company continued to have a monopoly of the trade.

The dominance of England on the Spanish Main and in India was followed by the ousting of the French in North America. The French had established themselves at the mouth of the Mississippi, and claimed all the country lying between the Saint Lawrence and the Mississippi west of the Alleghany mountains. The Seven Years' War in Europe gave England a chance to fight the matter out, and at the Peace of Paris in 1763 England gained Canada, all the land west of the Mississippi, four West Indian islands, and a promise not to fortify the French settlements in India; and from Spain she obtained Florida.

Thus by 1763 England was mistress of the whole American continent, and the dominant European power in India, while the trade and commerce of the East and West were in her supreme control.

England then felt that as she had done so much to protect the young colonies from being swallowed up by the French they ought to pay part of the cost of their own defence in future. She accordingly proceeded to increase the tax on colonial imports, and to prevent evasion instituted a stricter enforcement of the Navigation Acts. She also imposed a stamp tax. The colonists, who were no longer afraid of the French, wished to be free to work out their own destiny in their own way. Hence the revolt of the Americans in 1776, ending in the recognition of their independence in 1783. France and Spain had joined in against England, and, although the result was the loss of the American colonies, England was given a welcome opportunity of sweeping French commerce off the seas, and of finally ruining the Dutch shipping. England emerged in 1783 more decidedly than ever the great trading power of the world.

The loss of the thirteen American colonies raised the question of the disposal of convicts, since they could no longer be sent to the United States. Hence the Government turned its attention to Australia which had been explored by Captain Cook between 1768 and 1770. The island had been the resort of a few traders, but much preliminary work needed doing before it could become attractive to settlers, and the result was that convicts were despatched in 1788 to Botany Bay to do the preliminary work of

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road-making. Then, as the wool famine in England became more and more acute, the destiny of the colony shaped itself along the line of sheep-farming.

After the Revolutionary and Napoleonic wars England made a further addition to her possessions, gaining the Cape, from which she has been able to build up a South African Empire. Ceylon, British Guiana, Trinidad, Heligoland and Mauritius, were minor acquisitions made in 1815; and the foundations of her Far Eastern Empire were laid in the cession of Penang in 1786, which gave England a footing in the Straits Settlements.

The United Kingdom emerged from the Napoleonic wars with a huge national debt, but with an enormously increased trade; with fifty years start of Europe in manufacturing, and with the unrivalled possession of the sea-power which had been her definite goal from the time of Elizabeth onwards.

This great expansion could not have been accomplished if England had not been blessed with internal peace. Had Scotland declined in 1702 to accept a German line of kings and decided to pursue, as a large faction wished, her own independent way with her own king, England would have been in constant danger of invasion from the north on behalf of the Stuarts, or of intervention from an unfriendly kingdom. The Scotch, having been shut out of the best trading parts of the world, tried to establish themselves on the Isthmus of Darien, but met with disastrous failure, a failure which they laid to the door of England. In England this undertaking aroused a great fear of ultimate Scotch success in this particular line of commerce. It seemed better to absorb the Scotch than have them as rivals. England was also anxious to secure the assent of the Scotch to the House of Brunswick as the ruler of the two kingdoms and she accordingly offered them a share in the whole of the English trade if they would acquiesce in a union. The Scotch, who were most anxious to get a part of the English trade monopoly, assented. The union of the two kingdoms was thus accomplished, the Scotch sending members to the English Parliament and giving up their own, but preserving freedom in matters of religion. Scotland thus merged her individuality in that of England and accepted English trade privileges as a setoff against a German king.

Ireland was less fortunate. There was not the same necessity for conciliating her. The Irish Parliament was dependent on England, and when the Irish tried to set up their own king—James II.—they suffered crushing defeat at the battle of the Boyne. The English were not afraid of Ireland as they were afraid of Scotland. Ireland was a conquered country and as such must take the conditions imposed. She was, moreover, Roman Catholic, and England could not absorb her in the same way as she had Scotland. Hence Ireland was deliberately prevented from becoming prosperous by a series of laws which shut her out of the colonial trade and destroyed her woollen manufactures and cattle trade. At the same time a series of penal laws against the Roman Catholics were instituted which gave the power into the hands of the Protestant minority.

Both trade disabilities and religious oppression were successful in preventing Ireland from being a danger to England till the revolt of the American colonies gave Ireland the opportunity of claiming an independent Parliament, which demand was conceded in 1782. It became a question then of settling the trade relations between the two kingdoms and of the Irish contribution toward Imperial defence. No satisfactory solution had been reached when civil war broke out between the Irish Protestants and Roman Catholics. England felt that the Protestant interests in Ireland needed protection. Moreover the Irish finances became very involved, and it seemed as if Ireland was on the verge of national bankruptcy. The English manufacturers wished to secure the Irish market whereas the Irish Parliament showed a disposition to impose protective duties even as against England. It seemed best to the statesmen of the time to solve all these various problems by a complete union of the two countries. Scotland had come into the English system when the era of Whig protection was beginning, and she prospered exceedingly. It was hoped that Ireland would do the same. But Ireland came in just when England was engaged in a life and death struggle with France. She felt all the effects of the dislocation of trade and of the great financial strain. Later on her nascent industries were exposed to the overwhelming competition of the English machine-made products, and her provision and corn trade were vitally and injuriously affected by the English free-trade reforms, while she had no compensation as England had in her manufacturing prosperity.

Vast indeed are the changes recorded in the history of the 18th century. At the beginning of that century Scotland, jealous, sullen and separate, was a constant menace to the expansion of England; at the end she had become united with her southern neighbor in a political union cemented by identical trade interests. Ireland also had been united in a common Parliament, but cannot be said to have been absorbed in the same way. William III., like his predecessor on the English throne, acted as his own Prime Minister. Long before the death of George III. the monarch had given place to one of his powerful ministers as the real head of the executive government. In the early years of the century party ties sat lightly upon Ministers; at the end of it a Cabinet which was not homogeneous would have been an anomaly. At the beginning of the century France seemed destined to inherit the riches of the Spanish Main and the East Indies. The end of the century saw French commerce swept from the seas in East and West, and India under British rule. England's colonial empire of the first part of the 18th century was English speaking and not extensive. By the end of the century her principal English speaking possessions had cut themselves adrift: but had been replaced by a scattered empire of many races; and the foundations had been laid of that wide empire, the superstructure of which is not even yet complete.

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7. (b). **Great Britain — The French Wars of the Eighteenth Century.** Hostility to France is one of the chief characteristics of British policy in the 18th century. It may be ascribed to various motives, religious, dynastic, commercial, and to the purely political motive of maintaining the balance of power. At the beginning of the century the first and last of these motives were uppermost. The first collision between the two powers arose out of the efforts of Louis XIV. of France to gain complete control of the Spanish dominions, then comprising Southern Italy, Milan, and the greater part of the Flemish Netherlands, as well as a large portion of the New World. He would hear of no compromise such as was suggested by William III. of England, the Dutch Republic, and the House of Hapsburg, but, in the lack of a direct descendant of the Spanish Bourbons, claimed the crown of Spain for his grandson (subsequently Philip V. of Spain), a great-grandson of Philip IV. of Spain. He did more. He captured the Dutch troops who shared in the defence of the "barrier fortresses" of the Netherlands; and in 1701, on the death of James II., formerly king of England, but now an exile in France, he promptly recognized his son as King of England. The affront rekindled in England the dormant zeal for the Protestant succession; the House of Commons had to cease from its factious opposition to "Dutch William"; and the King prepared vigorously to curb the designs of Louis XIV. for a universal monarchy. He sent Marlborough with 10,000 troops to protect the Dutch Netherlands, and even the death of William, and the accession of Queen Anne, who leaned to the Tory or peace party, could not avert war. William's last diplomatic work, the grand alliance (1701), with Austria and the Dutch Republic held good, and the elector of Brandenburg-Prussia joined the league on the understanding that he should receive the royal title in Prussia, as Frederick I.

The world was soon startled by the display of genius such as had never been seen in the campaigns of William III. Clogged, as he was, by the dilatory procedure of the Dutch, Marlborough effected little of note in the years 1702–

3; but in 1704, when the Hapsburg forces were sore beset in South Germany by the Franco-Bavarian army, he resolved to march up the Rhine valley to the help of the Imperialists in Swabia. Skilfully misleading the French as to his intentions, he surprised the hostile forces near Donauwörth on the Upper Danube and clinched this success by a brilliant triumph at Blenheim, 13 Aug. 1704. A daring attack delivered across marshy ground against the French centre cut their array in twain, and drove thousands of fugitives into the Danube. Of an army 60,000 strong in the morning, only some 20,000 survived uncaptured at night. Marlborough was able to effect little in the year 1705, when the interest centred on the brilliant though unsubstantial triumphs won by Lord Peterborough in Spain. In the campaign of 1706, Marlborough struck a decisive blow at the French army under Villeroi near Ramillies (23 May); the capture of Brussels, Ghent, and Antwerp resulted from this victory, which also had the effect of lessening the pressure on the Imperialist leader, Prince Eugene, in Northern Italy. In 1707 the tide seemed to turn in favor of the French and Spaniards; the latter on 25 April gained a complete victory at Almanza, regained most of the eastern and northeastern provinces of Spain for the Bourbon cause. In July 1708, however, Marlborough utterly overthrew the French at Oudenard on the River Scheldt, and followed up his success by bringing the great fortress of Lille to surrender (December). These events laid the Spanish Netherlands at the feet of the allies and opened up a way into France.

Nevertheless, Louis XIV. rejected their terms, and, making an appeal to his people, continued the war with fresh vigor, which was seen in his troops during the stubborn and murderous conflict at Malplaquet, 11 Sept. 1709. The skill of Marlborough and Eugene gained the day, but it was a barren triumph. The war dragged on for three years more; but the growing desire for peace in England, and the partisan intrigues which resulted in the recall and disgrace of Marlborough, brought it to a conclusion in the Peace of Utrecht, 13 March 1713. Great Britain secured Gibraltar and Minorca, Nova Scotia, parts of Newfoundland, districts around Hudson's Bay, and the French part of Saint Christopher's. Spain, by what was called the Assiento Treaty, granted to her the sole right of importing slaves into the Spanish colonies of America. The Dutch retained their hold on most of the "barrier fortresses" of the Netherlands, and that territory, along with Naples and the Milanese, went to the Hapsburg Emperor, Charles VI. Philip V. retained Spain and the Indies, Great Britain rather shabbily deserting the Catalans whom she had instigated to rise against the Bourbon ruler. The treaty was not one to be proud of; but it restored the balance of power, and rendered impossible any further attack by Louis XIV. on Great Britain and Holland. The phantom of an almost universal monarchy ceased to trouble the world until it reappeared a century later in the person of Napoleon. Further, this war of the Spanish Succession so far exhausted France, Spain and Holland, as to leave Great Britain mistress of the seas.

The accession of the House of Hanover in

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1714 tended to embroil Great Britain in the political struggles of Central Europe. As electors of Hanover, the Georges were among the chief dignitaries of that venerable but decaying fabric, the Holy Roman Empire, and involved England in the disputes caused by the rivalry of the Houses of Hapsburg and Hohenzollern. The War of the Austrian Succession, which opened in 1740 with the seizure of Silesia by Frederick the Great of Prussia, aroused the sympathy of Britons with the young ruler, Maria Theresa of Austria; and when France joined the ranks of her would-be despoilers, Great Britain intervened in order to maintain her power as a counterpoise to that of France. George II., leading his troops in person, gained a victory over the French at Dettingen on the River Main, 27 June 1743; but two years later (11 May 1745) the British arms sustained a serious reverse at Fontenoy, near Tournay, where the genius of the *Maréchal de Saxe* prevailed over the stubborn valor of the British infantry. The Guards' Brigade retrieved the honor of the Union Jack by a splendid advance, which, if supported by cavalry, might have turned the fortunes of the day. As it was, the defeat at Fontenoy and the romantic campaign of "Bonnie Prince Charlie," grandson of James II., in Scotland, clogged British efforts on the continent with results disastrous to her allies. At sea, however, and in the colonies, the Union Jack was nearly everywhere successful, the capture of Louisburg (21 June 1745), leading to the reduction of Cape Breton Island and the opening of the Saint Lawrence to British attacks. Both powers at length became weary of the war, and by the Peace of Aix-la-Chapelle (October 1748), agreed to restore their conquests—a clause deeply resented by British seamen and merchants. France, however, guaranteed the Belgic Netherlands to Austria, and agreed to dismantle the fortifications of Dunkirk. The balance of power was thus restored, both in European and Colonial affairs.

In 1756 Austria's grievance against Prussia concerning the Province of Silesia lit the flames of war both in Europe, Canada, and India. Already France and Great Britain were practically at war in the valley of the Ohio and in the Carnatic, owing to the masterful policy there pushed on by Montcalm and Dupleix. Therefore, when France, reversing her traditional policy, allied herself with Austria for the partition of Prussia, Frederick the Great naturally became the ally of the Court of London (January 1756). At first matters went ill with the two Protestant States; Frederick could not at first make head against the coalition (joined by Saxony and Russia); and Great Britain lost Minorca, largely through Admiral Byng, who was executed. Matters did not mend until in June 1757, George II. recalled to office the one inspiring personality in English public life, William Pitt. Acting on the principle summed up in his famous phrase—"I will win America in Germany"—he lavished subsidies on Frederick the Great. Slowly but surely the tide turned; Frederick's brilliant victory at Rossbach (5 Nov. 1757), over the French and their allies paralyzed the French government; and the results of favoritism and incompetence became apparent. The French navy was speedily worsted in several fights; Louisburg surrendered to Boscawen on

26 July 1758, and Prince Edward Island also fell to the Union Jack. Late in November British and Colonial troops captured Fort Duquesne on the Ohio and it was renamed Pittsburg. In India success was chequered with failure. By the victory of Plassey (23 June 1757), Clive had subdued Bengal; but after the arrival of French reinforcements, Count Lally, the successor of Dupleix, captured Fort Saint David and nearly took Madras. Gradually the pressure of sea power told in favor of Great Britain, and the long struggle for the possession of the Carnatic was decided by Eyre Coote's brilliant victory of Wandewash (22 Jan. 1760), which led up to the capture of the French stronghold, Pondicherry, a year later.

Meanwhile, though Frederick the Great was very hard pressed, his ally reaped the full reward foreseen by Pitt. That statesman had the gift of choosing the right men; and his sagacity discerned in a young officer, Wolfe, the conqueror of Canada. The manner in which Wolfe captured the Heights of Abraham (13 Sept. 1759) is too well known to need description. Quebec and ultimately the whole of Canada were the fruits of a victory, which itself resulted from the ability of the mistress of the seas to attack when, where, and in what force she chose.

After the accession of George III. to the throne, and of the Bute Ministry to power, the Anglo-Prussian alliance lapsed; but the war with France continued. By the (third) Bourbon Family Compact, Spain made common cause with her neighbor; but the British navy overbore all opposition at sea; and in February 1763, the Peace of Paris put an end to what had now become merely a maritime and colonial war. France ceded Canada, Cape Breton Island, Prince Edward Island, together with Grenada, Saint Vincent, Dominica, and Tobago, as well as Senegal in Africa. Spain ceded Florida, but received from France as indemnity the great district of Louisiana. Great Britain restored to France several of her conquests in the East and West Indies, also to Spain parts of Cuba. Save that France handed back Minorca to England, the changes in Europe very slightly affected the Island Power; but she emerged, from what had been at first merely a continental war, the greatest of the world powers.

The completeness of her triumph brought its nemesis. The American War of Independence furnished France with the longed-for opportunity for revenge. She declared war formally against England in 1778 after her volunteers had long been helping the colonists. Soon the maritime policy of her rival leagued together the northern powers in the League of the Armed Neutrals. That war, however, having been described in the article UNITED STATES—AMERICAN REVOLUTION, it is unnecessary to comment on it here, or to advert to the influence which sea power exerted on the decisive event, the surrender of Cornwallis at Yorktown (19 Oct. 1781). By the Treaty of Versailles (3 Sept. 1783), France recovered Senegal, several West India islands, acquired extended fishery rights on "the French Shore" of Newfoundland, and gained Tobago. Of all the wars between England and France, that of 1778-1783 was most completely colonial in character and in its results. Never before had France dealt

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her rival so serious a blow; but it recoiled on herself; for the ideas of liberty and civic equality which her soldiers learned in the land of Washington were now carried back to the mother country with results fatal to the Bourbon monarchy.

The Revolutionary War (1793-1802), stands apart from the previous struggles in that it was at the outset largely, though by no means wholly, a war of opinion. It turned mainly on the question whether the French Republic could with impunity set aside the rights of the Dutch Republic over the navigation of the lower part of the River Scheldt, which Great Britain by the treaty of 1788 had undertaken to guarantee. The French in their resolve to make Antwerp a great port, persisted in ignoring that treaty; and matters were in a very strained state between England and France, when the execution of Louis XVI. at Paris, 21 Jan. 1793, made all hope of compromise impossible. The French on 1 Feb. 1793, declared war against Great Britain and Holland. These powers therefore joined the first coalition (Austria, Prussia, "the Empire," Sardinia, and Naples); but the jealousy of Austria and Prussia, the incompetency of the allied leaders, and the enthusiasm and energy of the French soon drove the allies out of their territory. A British force was defeated at Hondschoote near Dunkirk, and had to retire toward Ostend (September 1793). Two months later Admiral Hood's bluejackets and their Spanish and Neapolitan allies were driven from redoubts near Toulon; mainly owing to the skilful dispositions of Bonaparte, and had to abandon that seaport. The campaigns in Flanders languished owing to the paucity of the British forces, which had to leave the Low Countries early in 1795. In that year Prussia came to terms with France.

The coalition was shattered by the astonishing triumphs of Bonaparte in Italy (1796-1797), which compelled Sardinia, Naples, and finally Austria, to make peace. Holland and Spain, having become allies of the French, the war became solely maritime and colonial. Mutinies at Spithead and the Nore (April-June 1797), threatened to complete England's ruin; but the gloom of that year was brightened by the victory won by Jervis and Nelson over the Spaniards off Cape Saint Vincent (Feb. 14), by Duncan's triumph over the Dutch fleet at Camperdown (Oct. 11). Pitt's overtures for peace to the French government in August-September, came to naught. The scene of war then shifted to the Mediterranean where Bonaparte's great expedition captured Malta and Egypt, with a view to the eventual conquest of India. His schemes were thwarted by Nelson's brilliant victory near the mouth of the Nile (1 Aug. 1798); and the pressure of sea power received further illustration by a severe check administered to Bonaparte at Acre by Sir Sidney Smith's squadron. Britain put forth great efforts in India, where Wellesley's capture of Seriogapatam early in 1799 led to the overthrow and death of that ambitious ruler, Tippoo Sahib; and after Bonaparte's secret departure from Egypt, a British expedition under Abercrombie and Hutchinson finally compelled the French army which he left behind to surrender (27 Aug. 1801). Malta had fallen to the British fleet in 1800.

Meanwhile, the aggressive conduct of the French government in Europe had enabled Pitt to form a second coalition which swept the French forces from Germany and Italy. An Anglo-Russian force in Holland, however, fared badly and finally had to leave the country (Oct. 1799). At the close of the year Russia left the coalition. In 1800 the allies lost ground rapidly. Bonaparte, virtually master of France after the *coup d'état* of Brumaire (Nov. 1799), overthrew the Austrians at Marengo (14 June 1800); Moreau completed their disasters at Hohenlinden in December, and the Court of Vienna came to terms with France early in 1801. Bonaparte with rare skill now prepared to turn the tables against England by effecting an alliance with Russia, and reviving the League of the Armed Neutrals. Again his aims were thwarted by Nelson, whose victory at Copenhagen (2 April 1801), paralyzed the league. The assassination of the Czar Paul, and the accession of Alexander I., facilitated a compromise on maritime affairs; and the losses of the French in Egypt and Malta predisposed them to peace with England. Ultimately the belligerents came to terms in the Treaty of Amiens (27 March 1802), whereby England agreed to restore all her colonial conquests to France, Spain, and Holland (including the Cape of Good Hope to the last-named), except Trinidad and Ceylon, which the Spaniards and Dutch, respectively, ceded to her. Malta was to be restored to the Knights of Saint John (on conditions which proved to be unworkable), while Egypt reverted to Turkey.

In the Anglo-French wars of the 18th century the importance of the commercial and colonial motives is increasingly apparent. The first two struggles originated in dynastic affairs relating to the then dominant principle of the balance of power; but the increasing solidity of the European States and the growth of commerce under conditions which were almost prohibitive to foreigners, turned the gaze of statesmen more and more to the new lands beyond the seas. The result may be estimated by reading over the causes and results of the wars here briefly set forth. Europe, after settling down on the foundations laid in 1713 and 1748, occupied less attention from statesmen at London and Paris. The French Revolution brought matters back sharply to the old field of debate between the two powers,—the Netherlands; but when the weakness of the coalition, and the genius of Bonaparte made France paramount on the Continent, the struggle quickly became one for supremacy in the Levant, and the East and West Indies. The vigor with which he played the rôles of Caesar and Alexander the Great would have enabled him to wrest from England her world empire had he not been confronted by Nelson. Even so, the struggle between the secular rivals ended in 1802 on terms on the whole favorable to France; and it was soon clear that the first consul viewed the Peace of Amiens as an opportunity for strengthening the position of France in Europe, as well as her fleet and her colonies, in order to resume the struggle for empire under conditions far more favorable than Louis XIV. had ever known.

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8. (a). Great Britain—The Nineteenth Century. The history of the British people in the 19th century is dominated by three facts or tendencies, themselves the outcome of its past history and its physical environment: (1) a portentous development of the national resources, resulting from the industrial revolution, improved agriculture, and the colonial expansion of the 18th century; (2) consequent collisions or friction with other growing nations, especially Imperial France and Imperial Germany; (3) a revulsion of feeling in favor of peace, attention to domestic reforms and commercial expansion by pacific methods. These three phases of national life are closely related; the first is connected with the life of the 18th century of whose achievements—scientific and mechanical, military and maritime—it was the continuation. The second or warlike movement originated in the effort of an expansive but insular people to seek over-seas the material resources wanting at home, and prompted the efforts associated with the names of Nelson and Wellington, Dalhousie and Dufferin, John A. Macdonald, Parkes, Roberts, Kitchener and Cecil Rhodes. The third tendency, prudential or philanthropic in its origin, has as spokesmen Fox, Bentham, Shaftesbury, Peel, Cobden and

Gladstone. The following brief sketch is not intended to be a commentary on these statements; but they may be regarded as sign-posts helping the historical traveller along paths which, though far from easy, yet frequently run on parallel or converging lines.

The first 15 years of the century witnessed a phenomenal development both of the material resources of Great Britain and of the strife with France—both of them well marked features of the previous years. In the years 1801-1815 the inventions of Watt, Cartwright, Trevithick and George Stevenson led to an enormous expansion of the factory system and means of locomotion. But in those same years the material resources of the land were consumed in a struggle for national existence. The year 1803, which saw the renewal of war between England and France after the brief truce of Amiens, is marked by the exhibition of Trevithick's first locomotive. In the year of Waterloo (1815) Stevenson proved his Killingworth locomotive to be a practical success. The skill and expansive energies of man, which went to feed the flames of the great war, were also in large measure its cause. The rise of Napoleon to absolute power in France and his masterful interventions in neighboring States, his prohibition of British imports, and his endeavor to found a Colonial Empire at the expense of that of Britain brought about the mightiest of all Anglo-French wars, that of 1803-1814. It is worthy of notice that the influence of the autocrat brought back the struggle from the sphere of opinion to that of material and colonial interests characteristic of the 18th century. The war had three well marked stages. Toward the close of 1805 Trafalgar left England mistress of the seas, while Austerlitz made Napoleon master of the Continent. In the next two years he strove to mass all the continental states against her in a commercial war styled the Continental System. Its pressure seemed to be bringing England to the verge of bankruptcy; but in 1808 the revolt of Spain threw open the Iberian Peninsula and the Spanish and Portuguese colonies in America to British trade. The defection of Russia in 1812 ruined Napoleon's prospects and the subsequent campaigns (1813-1815) assured the triumph of England and the overthrow of the great Emperor. Her gains were colonial. Mauritius, Tobago and Saint Lucia were yielded up by France. For the Cape of Good Hope, Dutch Guiana, and Curaçoa, conquered during the war, the victor paid to Holland a sum of £6,000,000. Malta, Heligoland and a protectorate over the Ionian Isles were the sole acquisitions in Europe from a war which added more than £600,000,000 to the national debt. The strain had been terrible and nothing but the new strength gained from the factory system, improved agriculture, and the mastery of the seas, could have brought the country through. Pitt, "the pilot who weathered the storm," died in 1806; but his heirs, the Tories, held on to power until 1830.

The burden of debt hung like a millstone round the neck of the nation for the next generation. In place of an income tax (then viewed as essentially a war tax) imposts were in and after 1815 placed on all possible articles, in-

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cluding foreign corn. Demonstrations and riots were the result; repressive measures, such as the Six Acts of 1819, were of no avail; and the unpopularity of George IV. (1820-1830) brought the monarchy itself into danger. Yet this time of malaise and political reaction was not fruitless. Canning, as Foreign Secretary, did much to thwart the reactionary policy of the monarchs who had framed the Holy Alliance, and his encouragement of the Liberals of Spain and of the Greek patriots led to notable results in the lives of those peoples, as also in the attitude of the United States toward Europe. The abolition of civic disabilities affecting Nonconformists in 1828, and the emancipation of Roman Catholics in 1829 with the reluctant assent of the Wellington Ministry, showed that the days of privilege were over.

The event of the next year ushered in a new era. The death of George IV. brought to the throne his far more popular brother William IV.; and the general election, held during the excitement caused by the deposition of the elder House of Bourbon in the revolution of July 1830, in Paris, led to the return of a majority favorable to electoral reform at Westminster. After a long and acrid struggle the Reform Bill of 1832 was passed. It enfranchised in all parliamentary boroughs householders paying a rental of £10, also copyholders in the counties. It disfranchised a number of very small boroughs and transferred their voting power to the new manufacturing towns and districts. Thus the influence exerted by the second French Revolution on English democracy was far more favorable than that of the first revolution. The anarchy and the wars resulting from that great upheaval put back the cause of parliamentary reform in England for 50 years. The seeming success of the second revolution (July 1830) now added vigor to the English movement which had meanwhile been strengthened by the silent yet potent changes in the distribution of population and modes of life resulting from the industrial revolution. That change, ever working with accelerated energy, necessitated the transference of power from the old rural England to the new manufacturing England; and thanks to the accession of William IV. in 1830, and of Victoria in 1837, this momentous revolution took place peacefully. While breaking the power of the old Tory party, it rooted the monarchy more firmly in the hearts of the people.

The ensuing decades were times of great strain and stress, but they were met firmly and on the whole successfully. The wider sympathies and business aptitudes of the new Parliament showed themselves in the Factory Act (1833) of Lord Ashley—afterward Lord Shaftesbury; in the emancipation of slaves in British colonies, for which a sum of £20,000,000 was voted as compensation to the owners; and in the Poor Law Amendment Act of 1834 which cut at the roots of the growing evil of pauperism. Nevertheless the working classes of the great towns were in a state sometimes bordering on sedition, partly owing to resentment against the Whigs for refusing to extend the franchise laid down in 1832, and still more owing to the harsh administration of the new Poor Law. Trade depression, low wages, high

taxes and dear corn swelled the volume of discontent. It took form in two well defined movements, Chartism and the Anti-Corn Law League, which, beginning in the year 1837, ran a parallel and competitive course, and ended in the year 1848, the former in failure, the latter amidst almost complete success. This difference in the fortunes of the two movements may be ascribed to the following causes. The Chartists, (q.v.) sought to cure evils, which sprang mainly from economic causes, by purely political means. The six points of their Charter were (1) annual Parliaments, (2) manhood suffrage, (3) equal electoral districts, (4) payment of members of Parliament, (5) abolition of the property qualification for members of Parliament, and (6) vote by ballot. This programme (a revival of the advanced Whig programme of 1780) aimed at benefiting the working classes through Parliament. The Free Traders sought to benefit them by altering taxation so as to let in free, or nearly free, the necessities and small comforts of life. Further, Chartism suffered from the unwise means used by the physical force wing of the party whose leaders fell out with one another. The Free Traders on the other hand had excellent leaders, Cobden and Bright, whose arguments finally brought over to their side large numbers of the workingmen and the Prime Minister himself, Sir Robert Peel.

This able man had pieced together the Conservative party from the more malleable of the fragments of the old Tory faction; and, largely owing to the failures of the Whigs in finance, he came back to power after the general election of 1841 with a strong and apparently homogeneous following. His openness of mind soon brought him into collision with very many of his followers. He became a Free Trader, while they remained Protectionists. He soon came to see that the long series of deficits could be ended only by recourse to direct taxation; and in his budgets of 1842 and 1845 he abolished or greatly lessened duties on large numbers of articles, making good the temporary loss by an Income Tax of 7d in the £. He also lessened the sliding scale duties on foreign corn. The result was seen in improved trade and in a decline of pauperism and misery. In 1845-6 the Irish famine brought him to sacrifice the corn duties—a measure which earned him unmeasured abuse from Disraeli and Lord George Bentinck and the gratitude of the poor throughout the whole Kingdom. Thus the working classes gained their chief aims through the efforts of the Free Traders and the legislation of Peel. Consequently when the continental revolutions of the spring of 1848 induced the physical force Chartists to copy the methods which had been successful in Paris, Berlin and Vienna, the result was a ludicrous fiasco, which brought Chartism as an organized movement to an end. The spirit that had animated its best leaders, namely a burning love of freedom and a passionate desire for the moral and mental uplifting of the working classes, lived on in those Radical parsons, F. D. Maurice and Charles Kingsley, in the second founders of the Co-operative and Friendly Society movements, and in the later Radicals, who by wise methods soon gained four of the six points of the Charter.

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The same yearnings after ideals for other than those realisable by mere party strifes and sordid commercialism infused much of the best work of Carlyle and of his young disciple Ruskin, and throbbed in the youthful poems of Tennyson, Browning and Swinburne.

The decade of the forties, marked by political discontent, but dignified by ideal aspirations in all spheres—the disruption in the church of Scotland, the Anglican movement in the church of England and the pre-Raphaelite movement in art, belong to that momentous epoch—faded away into a period marked by expanding trade and mental quiescence. Gold discoveries, railways, steamships, these were the chief pre-occupation of mankind; and under their subtle alchemy democracy and idealism of all kinds vanished for a time, both in England and on the Continent. As often happens in these expansive epochs (which recur after the introspective, critical and reforming epochs), a collision occurred with another growing Power, Russia. The Crimean War resulted largely from the efforts of that stern autocrat, the Czar Nicholas I., to browbeat the Turks, whose political power was then thought to be essential to the security of the overland route to India. The hope entertained by the British nation that the Sultan would reform his government and grant religious liberty soon proved to be vain; and England came to see that she had championed a moribund cause. She gained nothing by the war; and its first reverses did much to promote the ferment in native circles in India which led to the terrible mutiny of 1857.

Affairs in Europe soon engrossed public attention. In the Crimean War, England had had the alliance of Napoleon III. of France and of Victor Emanuel II. of the Kingdom of Sardinia. Her relations with the French Emperor speedily cooled; and complications in the years 1858–59 brought the two people so near to a conflict as to lead to the revival of the volunteer movement. Far different was the attitude of the nation toward the Italian movement for liberation and unity. The masterly statecraft of the Piedmontese statesman, Cavour, and the heroic deeds of Garibaldi in southern Italy in 1860 aroused the keenest interest. The diplomatic help given by British statesmen, Palmerston and Lord John Russell, then laid the basis of that friendship which has since subsisted between Great Britain and the United Kingdom of Italy.

Amidst these excitements Cobden did good service by promoting a commercial treaty between England and France on free trade lines, (it held good for the years 1860–1870) and Gladstone, the Chancellor of the Exchequer, by his budgets of the early sixties succeeded in further cheapening the necessities of life. But no advance was made on purely political lines, firstly because the influence of Palmerston, the Prime Minister, barred the way, and secondly because popular interest centred largely in the wars of that troubled period—the American Civil War (which at one time portended a strife between the two kindred peoples), the Danish War of 1864, and the Austro-Prussian War of 1866. The end of this last struggle brought a lull which favored the hopes of reformers. The death of Palmerston on 18 Oct. 1865, removed another barrier; for, since the death of the

Prince Consort at the close of 1861, his influence in the political world had been almost without bounds. Other causes now helped to turn attention to home affairs. The cattle plague and the sharp financial crisis of the year 1865, the Fenian outrages of the next year, and the general state of malaise throughout the United Kingdom brought men once more to that critical or introspective mood which is favorable to political reform. A singular concatenation of events brought into office in June 1866 a Conservative Ministry headed by Lord Derby and Mr. Disraeli—into office but not into power, for they were face to face with a hostile majority, irritated by the recent rejection of a moderate Reform Bill championed by Lord John Russell and Mr. Gladstone. The result was a series of acrobatic performances whereby Disraeli, erstwhile the denouncer of the inconsistencies of Peel, foisted on his party in 1867 a measure far more democratic than that of the previous year. Household suffrage was thenceforth the law of the land for all parliamentary boroughs. After a short time of uneasy balancing, the Conservative Ministry was overthrown by the general election of November 1868.

Democracy now came in as with a flood. The Gladstone Ministry (December 1868—February 1874), carried legislative activity to lengths never before seen in England. The Disestablishment of the Irish Church (1869); the Irish Land Act and the Elementary Education Act (1870); the abolition of the system of purchase in the army, and the appointment of the Local Government Board (1871); the Ballot Act and Licensing Act (1872); the Supreme Court of Judicature Act (1873)—these were the chief measures passed in this period, which witnessed also the settlement of the Russian claims respecting the Black Sea and the Alabama claims urged by the United States. In these matters, as in the sphere of foreign policy generally, the Ministry was deemed to have sacrificed British interests needlessly.

The outcome of this feeling, and of the alarm felt by many classes at home whose interests were injured or threatened, was seen in the general election of February 1874, which marked a sharp reaction in favor of Imperialism and a spirited foreign policy. Disraeli (created Earl of Beaconsfield in August 1876) came back to power at a time when the Eastern Question entered on an acute phase. The years 1875–1878 were overshadowed by the atrocities committed by the Turks on their Christian fellow subjects, and by the Russo-Turkish War. Sharp differences of feeling were caused by Lord Beaconsfield's treatment of these events, as also by his acquisition of Cyprus (June 1878). Depression of trade at home and the outbreak of wars in Zululand and Afghanistan in 1870 made the Ministry more and more unpopular, with the result that the election of March 1880 brought back Gladstone to power with a large majority. His second ministry (April 1880—June 1885), coincided with a time of great ferment in Ireland and of unrest abroad, with which he coped manfully but not very successfully. Irish affairs were not settled by his drastic Irish Land Act of 1881; his very large concessions to the Boers of the Transvaal in 1881 and 1884 aroused a most bitter feeling

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among loyalists in South Africa and sowed the seeds of future trouble. British intervention in Egypt (1882) was successful, but had as an unfortunate corollary the despatch of General Gordon to Khartum; and the dealings of the Ministry with Russia respecting the Afghan frontier at Penjdeh, as also with Germany respecting various colonial questions on the coasts of Africa and New Guinea, were marked neither by foresight nor firmness. In the midst of these disturbances Gladstone, with characteristic tenacity, pushed through the Reform Bill of 1884 and the Redistribution Bill of 1885 in face of prolonged opposition from the Lords. The former measure extended household suffrage to the counties; the latter divided the whole country into electoral districts with some approach to numerical equality.

The general election of 1885 was of singular interest as marshaling the revived forces of Democracy and Imperialism. The former won, thanks to the votes of the newly enfranchised agricultural laborers; but the triumphant Liberal party was split in twain by Gladstone's Irish Home Rule Bill and Land Bill (April 1886). The general election of July 1886 reversed the decision arrived at 18 months earlier, and Lord Salisbury took office with a Unionist Ministry which sought—as he phrased it—to govern Ireland ‘honestly, consistently and resolutely.’ It also passed the local Government Bill (1888) the Irish Land Purchase Bill (1891) and strengthened the Army and Navy, and adopted a firmer tone on foreign affairs. In 1892 the swing of the pendulum brought Gladstone back to power—for the fourth time,—but in 1894 he retired and Lord Rosebery undertook to reconstitute the Ministry. Even his versatility failed to solve the difficulties arising from disunion in the cabinet and in the Liberal party, and from the tension in public opinion caused by massacres of Christians in Armenia and Crete. He resigned in 1895, and the ensuing elections brought back the Unionists to office with a majority larger than had been known since 1832. Lord Salisbury's new Ministry, which included some Liberal Unionists, had to grapple with a succession of difficulties—the Venezuelan affair, complicated by President Cleveland's message, Dr. Jameson's raid in South Africa, complicated by Kaiser Wilhelm's famous telegram, oppression and anarchy in Crete and many parts of the Turkish Empire, and the campaign against the Dervishes on the Upper Nile.

To these matters we cannot advert. We can point out here only two chief facts in the political history of the century—the gradual effacement of the old party lines, and the curious periodicity in the political life of Great Britain. To dwell on the latter of these, it is clear that the main tendency has been toward democracy and industrial development by peaceful means—a tendency dominant in the periods 1816-1848, 1866-1874, 1880-1886, 1892-1895. The intervening years were marked either by the quiescence which comes naturally after great constructive efforts, or by the striving after national security and the consolidation of the Empire which results inevitably from the insular position and expansive force of a virile people. The century closed, as it began, amidst what may be termed the imperial impulse, of which indus-

trialism has been the unconscious but all powerful feeder. The era of great production, coinciding as it does with one of militarism and protection on the Continent of Europe, imposes on England the need of looking and living beyond the seas to an extent unimaginable to the men of Nelson's generation. In this dualism of her interests, democratic and imperial, lies the great problem of her political life—a problem never to be solved but ever keeping her faculties tense and keen.

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8. (b). Great Britain — The Political Parties. Party government begins, in primitive society, with the struggle for power, the nature of which is determined in each case by local and tribal conditions, and by the influence of men who are or aspire to be leaders. At a later stage, when abstract logic is applied to questions of policy, the parties begin to argue from principles; they profess themselves friends of the people, friends of the better class, and so forth. The principles invoked are not scientific propositions; they are rather forms of language, such as are received with favor in a mixed assembly; the party-leader uses them so as to combine opinions and interests, to draw together a working majority. Each party borrows freely what seems to be effective and popular in the programme of its opponents. Moderate men of all parties think very much alike; they are kept apart by the personal struggle for power.

These general truths are well illustrated by the contest between Whigs and Tories in the 17th century. The Whigs were an aristocratic party, relying on the nobles, the landed gentry, and the City of London. Their principle was, the supremacy of the law: they were determined

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that the courts which administer the law, and the high court of Parliament which makes the law, should be freed from the arbitrary interference of the King. Moderate Tories did not undervalue the law; they argued that by law the King was entitled to obedience, and that the King then reigning had done nothing to forfeit his claim. The Whigs carried their point in 1688, by bringing in a foreign king, a capable, magnanimous man, not less firmly attached to his royal prerogative than the Stuart Kings had been. With the advent of the House of Hanover in 1714, Whig principles came once more to the front; for the first George and his son were Germans; they needed an interpreter between the King and the people; and the statesman who could manage the House of Commons was not, like Strafford or Clarendon, dependent on the support of his royal master. George III. on the other hand was a patriotic Englishman; he thought himself strong enough to choose his own ministers and to throw off the yoke of the Whig nobles. If he had possessed the administrative talent of Frederick the Great, he might have made himself the head of the Government and set himself above the parties. But King George was neither a great statesman nor a great soldier; he relied too much on the smaller arts of political management; and in the middle of his long reign he came under the influence of a minister whose commanding character excluded the king from the personal conduct of national business. It is to Pitt that we owe the outline of our modern constitution. At Windsor he was the servant of the Crown, arguing, often in vain, against the obstinate purpose of his master. In the Cabinet he was himself master; he chose his colleagues, and dismissed them when they opposed his policy. In the House of Commons, which was still an aristocratic body, his ascendancy was never seriously disputed, and he filled the House of Lords with peers of his own creation. So it was that Pitt, by birth and training a Whig, became the founder of the new Tory party.

Pitt's opinions were those of an official Liberal. He wished to reform the electoral system, to remove religious disabilities, to relax the rigor of laws which prevented the expansion of trade. But the fates had imposed upon him the task of steering the ship of State through a period of wars and revolutions: the work of reform was postponed to the necessities of foreign and domestic policy. When the great minister died, his unfinished schemes fell into the hands of men with whom postponement was a settled habit. During the long Tory administration of Lord Liverpool there was, in principle, but little difference between the parties. The middle classes were impatient, and some of them joined the workingmen in declaring that neither of the aristocratic parties could be trusted. These independent men called themselves radical reformers, and they sympathized with the aspirations of democracy in America, in Ireland, and on the continent of Europe.

The Reform Act of 1832 was a Whig compromise; it failed to satisfy the Radicals, but it gave them a foothold which they never lost. It was indeed the first attempt to apply abstract principles to the English constitution, and it started a momentous process of change. Tra-

dition was dethroned, and the old party names had become unpopular. The Whigs began to call themselves Liberals, a name which some of them declined, because it suggested humanitarian tendencies with which they were not in sympathy. Macaulay, for example, would not call himself a Liberal, because, as he said, he was in favor of "war, church establishments, and hanging." The Tories in their turn became Conservatives; they accepted the results of 1832, but deprecated any further change in fundamental institutions. The Radicals of that day were middle-class men, disciples of Bentham; they stood for cheap government, freedom of contract, and individualism. Socialism made its appeal to the unenfranchised laborers, but as yet without much visible success. The Factory Acts, for example, were carried by Tory humanitarians, against the opposition of Radical manufacturers. Free trade, when it came, was the work of a Conservative administration; the Liberals approved; the older Whigs, like Lord Melbourne, thought that Peel had betrayed the landed interest. Lord Derby, a hereditary Whig, was carried over to the conservative Tories by his fears for the Church and his dislike of free trade.

The conflicting tendencies of the half-century after the first Reform Act are summed up in the careers of two men who were to take a leading part in the transition to democracy. Disraeli entered life as a Radical; he was always hostile to the Whig oligarchy. His sympathies were with the Tories; his father, a quiet scholar, had taught him to take the side of the Stuart Kings, and to regard the old nobility as the true leaders of the people. If Peel had given him office, he might have become an orthodox Conservative; but the leaders of that party had no place for an able Jew, who lacked the public school and University stamp. Disraeli took his revenge by attacking Peel and his free-trade policy; his merciless wit gave him the ascendancy, even with men who still distrusted him; he gained the confidence of Lord Derby, and in alliance with him began the construction of what was really a new party, the party of Tory democracy. In 1867 the new Tories took their famous "leap in the dark" by establishing household suffrage in the boroughs. The immediate result was a crushing Liberal victory; but in 1874 the forces of Tory democracy were strong enough to place their leaders in power. Six years later, the pendulum swung back, and Mr. Gladstone was once more supreme.

Lord Beaconsfield died in the moment of defeat, but his genius presides over the party which he formed, and profoundly affects the mind of the nation. He never concealed his belief that the conduct of public affairs, especially foreign affairs, must be left to sovereigns and statesmen. At the same time, he was always in sympathy with the aspirations of the workingmen. He was the only public man of his generation who perceived that Benthamite Liberalism was certain, sooner or later, to become unpopular, and he prepared the way for that modified socialism which is now the accepted creed of both parties. And again he perceived that Englishmen, without distinction of class, are conscious of their position as an imperial power, and determined to maintain it.

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Disraeli himself, in his earlier days, had taken the narrower views of England's responsibility to India and the colonies; his later speeches are full of the sentiment of empire. Englishmen are all (to some extent) socialists now; and are all (in one sense or another) imperialists.

Mr. Gladstone began his career as the rising hope of Oxford Toryism. He was honestly afraid of Radicalism; he distrusted the Whigs; the mission of the Tory party was to "maintain truth" by supporting the Church of England. At the age of 30 he published his book on 'The State in its Relations with the Church' — a noble vindication of the Church as a spiritual society, pledged to maintain her conflict with sin and selfishness, a society to which the support of the State is not essential, but may, under proper conditions, be useful. It was in the interest of the State that Gladstone argued for the establishment and endowment of the Church. His argument was coldly received; the qualified approval of Peel, the scornful criticism of Macaulay, began to work a change in Gladstone's political mind. No criticism touched his ideal; but in the present age of the world the ideal was, perhaps, unattainable. If Whigs and Conservatives were equally unable to rise to his conception of the Church, if the price of establishment was to be subordination to the State, what then? The Church, to preserve her freedom and purity, might withdraw from the alliance, surrendering those of her privileges which might be found inconsistent with abstract political justice. Within a few years after the publication of his book, Mr. Gladstone was discussing the possible advantages of disestablishment.

Sir Robert Peel was not pleased to see an able young party man so preoccupied with ecclesiastical questions. He drew Gladstone into his ministry, placed him at the Board of Trade, and worked him very hard. In the transition to free trade, master and pupil moved steadily together. While Peel was leader, there could be no doubt as to Gladstone's party connection; when that guiding influence was removed, he was carried about by various kinds of doctrine. Though more than half a Liberal, he was still afraid of Radicalism. He approved of Lord Palmerston's passive resistance to the extension of the franchise, but this was his only link of sympathy with the coming leader of the Liberal party. There was much agreement between Gladstone and Lord Derby; both were Oxford Tories, and devoted Churchmen; but by this time Lord Derby was identified with Disraeli, and the Peelites would not serve under the man who had planted so many barbed arrows in the sensitive spirit of their chief. After long hesitation, Mr. Gladstone threw in his lot with the Liberals. In June 1859 he supported Lord Derby in a critical division; ten days later he took office under Lord Palmerston.

As a member of a Liberal Government, Gladstone stood committed to parliamentary reform. His Whig colleagues discovered with alarm that this late convert was not merely a reformer; he was a democrat. He declared, from the Treasury bench, that the laboring class had a moral right to come within the pale of the Constitution. There was now only one link between the Liberal champion and the Toryism of his youth;

he was still member for the University of Oxford. That link was severed when the University rejected him in 1865. Mr. Gladstone appealed to the people of Lancashire, and entered on the first of those oratorical campaigns, which were to change the face of English politics.

The franchise question was settled, for a time, by the Tories in 1867, and the popular vote of 1868 was a personal vote for Mr. Gladstone. With a wide and varied electorate, and many interests competing for notice, the people are easily persuaded to accept the supremacy of one man, who, like General Jackson, "acts always for the good of the country." Under such conditions, the leader of opposition, if he knows his business, has his rival at a disadvantage. It is the men in power who have to make terms with foreign governments, and to protect the national purse; however well they do, it is always easy to show that they might have done better. Mr. Disraeli made good use of his opportunities, and in 1873 the tide of Liberal success was ebbing rapidly. Mr. Gladstone was alarmed, and he would fain have made his defeat on the Irish University question an excuse for bringing his opponents into office. Disraeli saw the snare and avoided it, and the wisdom of his tactics was justified by the Conservative victory of 1874. As a leader of opposition, Mr. Gladstone disregarded what were then supposed to be the conventions of party life. He retired from responsible leadership; returned to the field just at the moment when his action was most likely to embarrass his successors; and finally presented himself to the country as a candidate for power. In the election of 1880 his success was complete, and the death of Lord Beaconsfield left him without a personal rival. But once more the tide ebbed as rapidly as it had risen. In a few years it became evident that the Liberal party was hopelessly divided on three issues of cardinal importance — disestablishment of the Church, Home Rule for Ireland, and the schemes of modified socialism advocated by Mr. Chamberlain. Old badges and cries were out of date. Mr. Parnell was forming an Irish party, so severely disciplined that no member of it could break away or disobey orders. For a few eventful months there was also a Fourth Party, a small band of Tories who obstructed their own leaders, addressed themselves in a democratic spirit to the conservative rank and file, and made themselves so strong that in 1885 Lord Salisbury was compelled to take them into partnership.

At the general election of 1885, Mr. Gladstone endeavored to keep his party undivided by postponing all troublesome questions. He did not declare against Home Rule, but he pointed out the danger of allowing Mr. Parnell to hold the balance of power. This was his reason for asking the country to give the Liberals a majority large enough to make them independent of the Irish vote. In the event, parties were so distributed that the Conservatives and Parnellites, if combined, would be equal or superior in number to the Liberals. Mr. Gladstone accepted Home Rule. It would be quite unfair to represent his conversion as a bid for power and nothing more. The argument for Home Rule was a strong one, and

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both the great parties were studying it in a practical spirit. But, with all his vast experience of affairs, Mr. Gladstone was subject to illusions. He believed that the Irish demand, as presented by him to the electors of England and Scotland, would prove to be irresistible. In this belief he cashiered those of his supporters who refused to follow, and when the House of Commons rejected his proposals, he hurried on a "penal dissolution" and went again to the country. The "classes," he said, were against him; he appealed to the "masses." The masses responded by placing the Unionists in power.

In the Parliament of 1886-92 the Liberal Unionists occupied a position somewhat analogous to that of the Peelites in 1850. They were stronger in ability than either of the great parties; they sat on the Liberal benches, and co-operated steadily with the Conservatives. Lord Salisbury in office did himself no discredit; but he had to make himself responsible for unpopular measures. The Crimes Act of 1887 was in itself a moderate measure, but it was a deep disappointment to many who had begun to hope that Ireland might be governed without repressive legislation. A good many independent Liberals fell quietly into line with their old party; the swing of the pendulum was felt. In 1892 Mr. Gladstone became Prime Minister for the fourth time, and entered buoyantly on the task of framing a second scheme of Home Rule. When the scheme appeared, his party saw plainly that it was not an improvement on the Bill of 1886. Discipline was maintained; the Bill of 1893 was carried through the House of Commons, and it was darkly intimated that the House of Lords must accept it, or take the consequences. The Lords rejected the Bill by a very large majority. Mr. Gladstone was at the end of his physical resources; and Lord Rosebery was not the man to succeed where the old leader had failed. The election of 1895 vindicated the shrewd forecast of the Lords and restored Lord Salisbury to office.

From this time forth the Liberal Unionists were identified with the Conservatives; but in consenting to share the spoils of victory they did not withdraw the Liberal or Radical opinions which they had professed. Mr. Chamberlain, for example, has not withdrawn his objection to church establishments; he cannot, of course, give effect to his opinion so long as he retains his connection with the Unionist Party, which is pledged, as a party, to the defence of two established Churches. On that question no difficulty has arisen, but, at the height of its success, the party has been broken up by the controversy initiated by Mr. Cham-

berlain's attack on "one-sided free trade." As conceived by its author, the plan of modified protection has two aspects, socialist and imperialist. It aims at securing constant employment for the British workingman, and at consolidating home interests with those of the colonies by means of preferential tariffs. The plan has been advocated in a series of speeches which could hardly be excelled for clearness and force; but the electors are not convinced. In January 1906 the fiscal question held the field; and free trade carried all before it. The Unionist Party is left, for the moment, in a helpless minority: its leaders find comfort in recalling the precedents of 1841, 1874, and 1886—the years in which the Conservative party recovered its ground after an apparently crushing defeat.

The Government in power is supported by the Whig Liberals and by the Radicals, who combine Manchester doctrines with modified socialism as best they can. In former Parliaments, labor members were few, and voted with the Liberals. They still prefer Liberals to Unionists, but their support is given in return for concessions which put a strain on the Liberal members of the Cabinet. On Irish questions, the Nationalists vote with Government, on the understanding that Mr. Gladstone's policy will be revived at an early date; but where Catholic schools are concerned that vote is hostile to the educational policy which commends itself to most Liberals. The Unionists' opposition is seriously embarrassed by differences of opinion in regard to free trade. Amid these currents and cross-currents, the leader of the moment must steer the best course he can; at any moment forces now in conflict with one another may combine to sweep him out of his place. We still defer to the notion that there are two great parties in the State; but the House of Commons has in fact become a collection of groups, like the Reichstag or the Chamber of Deputies.

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India.*

THE MECHANISM OF GOVERNMENT.

9. *Great Britain—Parliament.* The British Parliament has its roots deep in the past. It has legislated continuously for a period of more than 600 years, a record unapproached in the history of the world. It has been developed by successive stages from the Great Council of the Norman and Angevin Kings. Much of its ceremonial dates from Plantagenet times.

The foundations of this procedure are imbedded in Elizabethan Journals. It holds its sittings in a royal palace, which, though for the most part modern in its structure, is venerable in its associations. The New Palace Yard, through which members of the House of Commons hurry to their daily duties, is the yard of the new palace which William Rufus built, and

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which is still represented by Westminster Hall. There is scarcely a feature of Parliament which can be adequately described without long historical explanations.

Parliament consists of the King, the House of Lords, and the House of Commons, or, as described in the enacting formula of Acts of Parliament, the King's most excellent Majesty, the Lords Spiritual and Temporal, and the Commons. These are not as is often, but erroneously, supposed, the three Estates of the Realm. The clergy, who once counted as a separate Estate from the Lords and Commons, have long ceased to do so. The bishops, or some of them, sit, as Lords Spiritual, in the House of Lords. The inferior clergy are, for purposes of representation, merged in the laity, and represented in the Commons. An image of the full Parliament, as it existed in Plantagenet times, may still be seen when the King in person formally opens Parliament at the beginning of a session. The King sits on his throne, attended by his great officers of State. The benches of the House of Lords are occupied by the Lords Spiritual and Temporal, and by the peeresses. The judges, summoned as attendants, sit on their woollsacks in the middle. The Commons, as befits their humbler station, find such room as they can, in or about the bar, with their Speaker at their head.

The King, acting on the advice of his Ministers, summons, prorogues and dissolves Parliament. He communicates with the two Houses by speech from the throne, commission, message and otherwise. He gives his assent to Bills by commission. But he does not take part in, or attend, the deliberations of either House. Since Charles I. attempted to arrest the five members no King or Queen has been seen inside the House of Commons. Charles II. sought amusement in listening to debates of the House of Lords, but his example has not been followed.

The House of Lords consisted at the end of 1905 of nearly 600 members, including 3 Princes of the Blood Royal, 2 Archbishops, 22 Dukes, 23 Marquises, 126 Earls, 31 Viscounts, 24 Bishops, 315 Barons, 16 Scottish and 28 Irish representative peers. There are more than 24 bishops, but there is only room for 24 of them to sit as peers in the House of Lords. A junior bishop has to wait, unless he holds the see of Durham, Winchester, or London. Representatives of the Scottish and Irish peerage are elected by their peers, Scottish peers for each Parliament, Irish peers for life. But many of the peers of Scotland and Ireland are also peers of the United Kingdom and sit as such. Of the barons a few hold life peerages, as being, or having been, Lords of appeal; the other Lords Temporal hold hereditary peerages.

The House of Commons consists of 670 members, 465 for England, 30 for Wales, 72 for Scotland, and 103 for Ireland. Single-member constituencies are the general rule, but in a few cases one constituency returns two members. Every male householder who has resided in his constituency for a year, and has paid or compounded for his rates, is entitled to be registered, and, when registered, to vote as a parliamentary elector for that constituency. This is the most general franchise, but there are

others, including the occupation of lodgings rented at £10 a year, and the ownership or occupation of land or buildings of a certain value. Some of the universities return members, elected by their graduates. Women are not entitled to the parliamentary franchise. A proposal to abolish the plural vote, *i. e.* the right to vote in more than one place, is now before Parliament. Subject to disqualifications arising from peerage, holding of office, bankruptcy, and conviction of treason or felony, every British subject who is of full age is eligible as a member of the House of Commons. A peer of the United Kingdom or of Scotland is not eligible, but a peer of Ireland is eligible for any but an Irish seat. For instance Lord Palmerston was an Irish peer. Where a member of the House of Commons is described as a Lord, he is either an Irish peer, or, more frequently, a commoner holding a courtesy title as son of a peer. Members of the permanent civil service, and most judges, are ineligible.

The evidence of election is the return sent to the Crown Office by the returning officer at the election. If the validity of an election is disputed, the question is tried and decided by election judges appointed by, and from among members of, the High Court. A member must, before sitting or voting as such, except in the election of Speaker, take the oath of allegiance, or make an affirmation to the same effect.

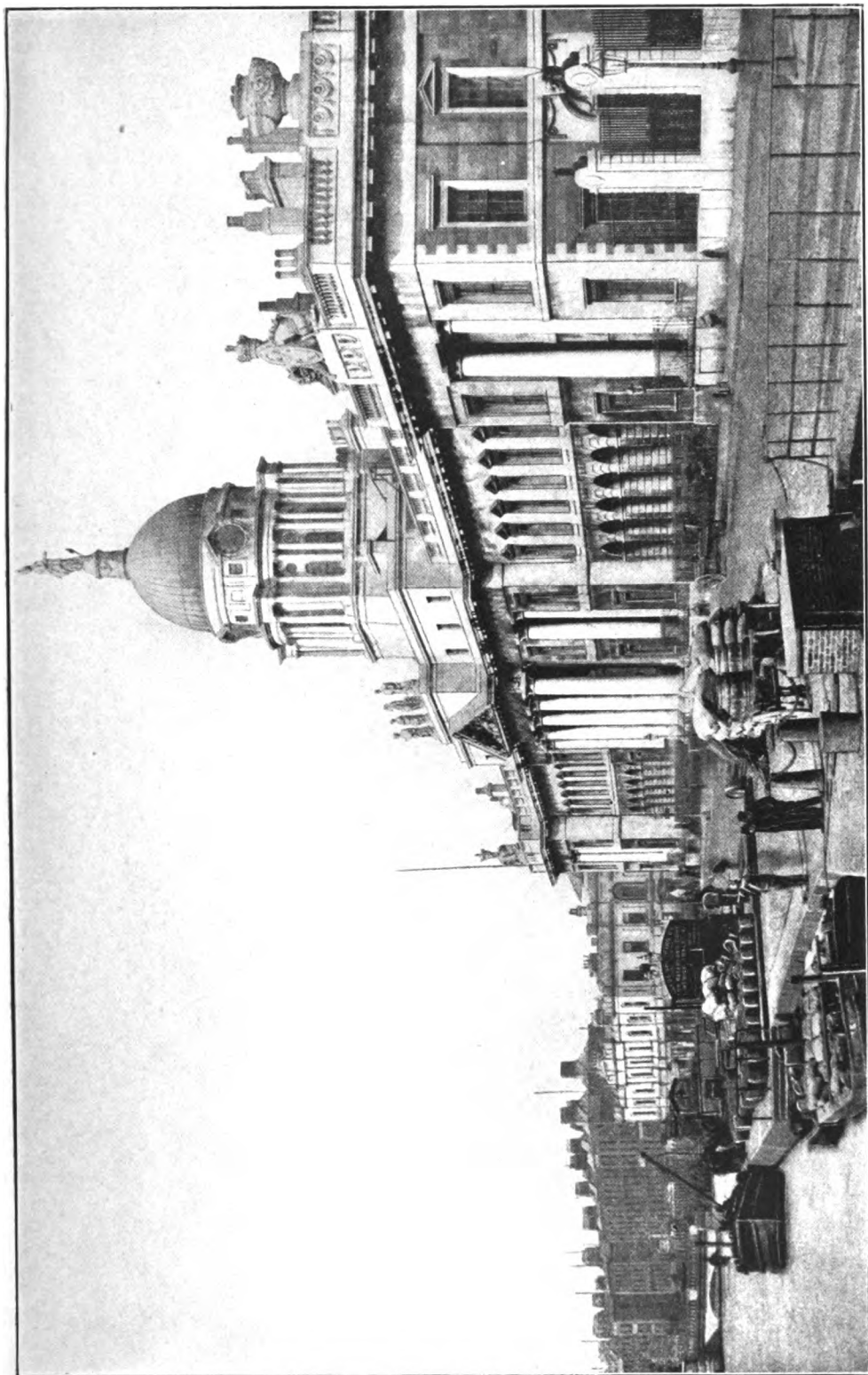
The chief alterations in the electoral law which took place in the 19th century were the Reform Act of 1832 which abolished pocket boroughs and enfranchised the middle classes; the Reform Act of 1867 which, by establishing household suffrage and introducing the lodger franchise in boroughs enfranchised the urban working man, the Ballot Act, 1872, which introduced secret voting, the Reform Act of 1884, which enfranchised the rural laborer by extending household franchise to the counties; and the Redistribution of Seats Act, 1885, which made single member constituencies the general rule, and raised the number of seats to 670.

The two houses hold their sittings in the Palace of Westminster, which is appropriated to their use and to the use of the offices connected with them. The chambers in which they sit are so placed that, if the intervening doors are open, the King's throne at the south end of the House of Lords is visible from the Speaker's chair at the north end of the House of Commons. The House of Commons does not occupy the site of the old Saint Stephen's Chapel, which was burnt down in 1834, but is constructed on the same general plan, and does not provide sitting accommodation, in the body of the House, for more than about 300 out of the 670 members. For discomfort of crowding there is some compensation in ease of hearing.

The accident that the House of Commons sits in a narrow room, with benches facing each other, and not, like most Continental legislatures, in a semi-circular space, with seats arranged like those of a theatre, makes for the two party system, and against groups shading into each other.

The duration of a Parliament is limited by the Septennial Act of George the First's reign to seven years, but its existence is always terminated by dissolution before the expiration

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CUSTOM HOUSE, DUBLIN, IRELAND.

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of that period. The royal proclamation which dissolves one parliament always summons another.

There are, or may be, several sessions of the same Parliament. A session is terminated by prorogation, which is an act of the Crown, done on the advice of Ministers. The business of each session begins with a King's speech, which announces its programme, and ends with another King's speech, which reviews its proceedings. Each House has the power of adjourning its sitting from time to time. Thus it adjourns from day to day, and always adjourns for a short recess at Easter and Whitsuntide. The two Houses usually meet in February and sit till some time in August, but sometimes hold a late autumn sitting after an autumn recess. The time of meeting is practically fixed by the financial year, which ends on 31 March. Estimates for the ensuing financial year cannot well be got ready before February, and there is certain financial business which must be got through before the end of March.

Each House has its own staff. The Lord Chancellor is Speaker of the House of Lords, and is assisted by a salaried Lord Chairman of Committees. The House has a permanent clerical staff with the Clerk of Parliaments at its head. The Gentleman Usher of the Black Rod, who has a Yeoman Usher to assist him, summons the Commons when their attendance is required in the House of Lords, and performs certain other functions, mostly ceremonial.

The Speaker of the House of Commons is elected by the House from among its own members for each Parliament. He is the representative and spokesman of the House in its collective capacity (whence his name); he presides at meetings of the House; and he declares and interprets its law. He is independent of party, and his tenure of office is not affected by a change of ministry. His powers are more extensive than those of the Speaker of the House of Lords. He has an official residence, besides his salary. He is assisted by a Chairman and Deputy-Chairman of Ways and Means, who take the chair at meetings of a committee of the whole House (there are temporary chairmen also) and who can take the Speaker's place as Deputy Speaker during his temporary absence. These are the only members of the House who receive salaries as officials of the House.

The Clerk of the House of Commons is the head of its clerical staff. The Sergeant-at-Arms sees to the maintenance of order within the precincts and to the execution of the orders of the House, and, as Housekeeper, looks after its domestic staff and arrangements.

The law of Parliament consists of the rights, usages, practice and regulations of each House. It may be classified, from a Benthamic point of view, as a substantive law of rights and privileges, and an adjective law of procedure; or, again, as an unwritten customary law to be gathered from precedents and decisions, and an enacted law to be found in orders of the Houses. The substantive law would include the rules which govern the rights of each House, or of the individual members of each House, in their relations to each other, to the

Crown, to the executive and judicial authorities of the country, and to individuals and bodies outside Parliament.

The privileges which are formally claimed by the House of Commons by its Speaker at the beginning of each Parliament, bulked large in the 17th century controversies between the King and Parliament, and were much insisted on by the Commons of the 18th century, but in the 20th century have retired into the background. The cases in which a member of Parliament, as such, can claim any exceptional privilege or immunity are now few and rare.

The House of Lords is not only a branch of the legislature but the ultimate court of appeal from the ordinary courts of the United Kingdom. (Appeals from the colonies and dependencies and ecclesiastical and certain other appeals lie to the Judicial Committee of the Privy Council.) It performs its judicial functions exclusively through those of its members who hold or have held high judicial offices. It holds its judicial sittings in the morning, and can sit judicially when the legislature is not sitting. For legislative and general business, its sittings begin at 4.15 in the afternoon and, as a rule, are not of long duration. The cases in which they extend over the dinner hour are exceptional. It does not sit on Wednesday or Saturday.

The House of Commons, when in session, sits from 2.45 to 11 on Monday, Tuesday, Wednesday and Thursday, and from 12 to 5 on Friday. It begins with uncontentious private bills and other formal business. Questions to Ministers (which are not put on Fridays), occupy or may occupy the time till 3.45. As soon as questions have been disposed of, the public business of the day begins. Opposed business is not taken after 11, unless it belongs to a special "exempted" class, or unless the eleven o'clock rule is suspended.

The business of the House of Commons is three-fold, legislative, financial, critical. It makes laws with the concurrence of the House of Lords and of the Crown. It imposes taxes and appropriates revenue. By means of questions and discussions, it criticizes and controls the action of the executive.

While a project of law is before either of the two Houses it is called a Bill. When it has received the royal assent it is called an Act. A bill may be introduced into either House by a member of that House. When it has been introduced, it is read a first time and is printed by order of the House. The stage of first reading is formal. On the second reading questions of principle are discussed. If the second reading is affirmed, the bill goes to a committee, which, in the House of Commons, is either a committee of the whole House, or one of the standing committees on bills, or a select committee. In the absence of special order it goes, under the existing orders, to a committee of the whole House.

A committee of the whole House is really the House itself sitting in a less formal manner, presided over by a chairman at the table, the Speaker's chair being vacant, and freed from some of the restrictions which attach to proceedings when the Speaker is in the chair.

The standing committees on bills, of which

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there are at present two, are constituted by the committee of selection, and are intended to be microcosms of the whole House. Each of them consists of not less than 60 members, and the quorum of each is 20.

A select committee is appointed by the House, and its members are nominated by the House itself, or, in some cases, either wholly or partially by the committee of selection. The nomination of members by the House is made in pursuance of arrangements between the "whips" of the several parties. There may be joint select committees of the two Houses. When a bill has gone to a select committee, it must subsequently pass through a committee of the whole House, but this is not a case with a bill sent to a standing committee.

At the committee stage a bill is gone through clause by clause, and amendments are proposed, discussed, and, if agreed to, made in the bill. When the consideration of a bill in committee is concluded, it is reported to the House, with or without amendments, as the case may be. On consideration of the report, there is an opportunity for making further amendments.

The next stage is the third reading. In the House of Commons this is the final stage, and only verbal amendments can be proposed. In the House of Lords substantial amendments can be moved at this stage, and also on the subsequent question, not put in the House of Commons "that this bill do pass."

When a bill has been passed by either House it is sent by message to the other House to pass through its several stages there. If the second House amends a bill thus sent to it, it requests the concurrence of the originating House in the amendments. Should the two Houses differ, amendments and counter amendments pass to and fro until an agreement is arrived at. But if no agreement can be arranged, the bill drops. If a public bill is not either passed or withdrawn in the course of a session, it lapses at the end of the session.

The final stage of a bill is the royal assent, which is given, by commission, in the House of Lords, in the presence of representatives of both Houses. As the King can only act on the advice of his Ministers, who presumably command a majority in one of the two Houses, the royal assent to a bill is now given as a matter of course. The last instance of refusal was in the reign of Queen Anne.

A distinction is drawn between public bills, the object of which is to alter the general law, and private bills, the object of which is to alter the law relating to some particular locality, or to confer rights on or relieve from liability some particular person or body of persons. The procedure on private bills differs materially from that on public bills, and is governed by a different set of standing orders.

Every private bill goes, after second reading, to a small committee, before whom, if the bill is opposed, witnesses are called and counsel heard. The proceedings before these committees are quasi-judicial in their nature. Many things which used to be done by private bills, are now done by provisional orders, which are made by a public department, after local enquiry, and when made, are confirmed by provisional order confirmation bills, to which

they are scheduled. Sometimes, to prevent hardships, the proceedings on a private bill are continued, by special order, to another session.

The right of granting money in Parliament belongs exclusively to the House of Commons. The House of Lords assents to, and may reject, a grant of money, but cannot initiate or alter a grant.

The right of the House of Commons to grant or raise money is subject to two important restrictions. It cannot vote money except in pursuance of a request from the Crown. It cannot impose or increase a tax unless the tax or its increase is declared by the constitutional advisers of the Crown to be necessary for the public service.

The demand by the Crown for the grant of money for the service of each financial year is made in the speech from the throne at the beginning of each session. As soon as practicable afterward estimates are presented to the House showing the amount which will be required for the public service. Supplementary financial estimates for the current financial year are also, if necessary, presented. The ordinary annual estimates are presented in three parts or divisions, each comprising one of the three branches of the public service, namely, the navy, the army, and the civil service. Each estimate contains first, an estimate of the total grant thereby demanded, and then, a statement of the detailed expenditure under each grant, divided into subheads or items. For the purpose of considering these estimates, and voting the money required, the House resolves itself, at the beginning of each session, into a committee of the whole House, which is called the committee of supply. Not less than 20 days must be allotted in each session for the sittings of this committee. Votes which have not been previously considered and disposed of by the committee are passed *en bloc* at the end of the session. When the resolutions for the votes have been passed by the committee they are reported to and confirmed (technically "agreed to") by resolution of the House. Resolutions authorizing the grant out of the Consolidated Fund of the money required to make good the supply voted in committee of supply are passed by another committee of the whole House, called the committee of ways and means, and are also confirmed by resolutions of the House. And these resolutions are finally confirmed by one or more Acts of Parliament called Consolidated Fund Acts, and by the annual Appropriation Act which is passed when the supply for the year has been disposed of. Before the end of each financial year, a vote on account is always necessary to supply the current expenses of the civil service during the next financial year, and, for a similar reason, a sufficient amount of money must also be voted for the Navy and Army, in whose case there is greater facility for transferring money provisionally from one vote to another. A Consolidated Fund Act confirming these votes must also be passed before the end of the financial year, i. e. before March 31. It follows from the principles laid down above, that the committee of supply and the House can reduce, but cannot increase, a grant

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asked for by the estimates. Nor can they alter its destination.

Once a year the Chancellor of Exchequer, in committee of ways and means, makes his annual budget statement, reviewing the revenue and expenditure of the past financial year, estimating the revenue and expenditure for the next financial year, and proposing such increases or remissions of taxation as are in his opinion required for, or justified by, the position. These proposals are embodied in resolutions which, when passed by the committee of ways and means, and agreed to by the House, are confirmed by an Act of Parliament, called the Finance Act of the year. Here again the House and its committee can dissent from, or reduce, a proposed tax, but cannot impose or increase a tax.

Under the Cabinet system the executive government is dependent on the support of Parliament, and, in particular, of the House of Commons. The King appoints a Prime Minister who can command a majority in that House. The Prime Minister selects the members of his Cabinet, and the holders of minor political offices, from among those of his followers who have, or are likely to have, seats in one of the two Houses. The Ministry as a whole, and each Minister separately, is responsible to Parliament, and particularly to the House that supplies the money without which government cannot be carried on. If a Ministry cannot retain the confidence of that House the Prime Minister must either resign or appeal to the country by a dissolution of Parliament.

The control of the House of Commons over the executive Government can be exercised, not only by withholding assent to the legislative and financial proposals of the Government, but in various other ways. Thus it can obtain information as to the proceedings of the Government by means of questions and of orders for the production of documents.

Any member has the right to address a question to any Minister of the Crown, being also a member of the House, about the public affairs with which he is officially connected, or a matter of administration for which he is responsible. The proper object of such a question is to obtain information on a matter of fact within the special cognizance of the Minister, and the rules and practice of the House limit the right to ask questions so as to confine them to this object. Except in special cases, notice of any such question must appear on the notice paper at least one day before the answer is to be given. If a member wishes his question to be answered orally, he marks it with an asterisk, and a time is set apart at the beginning of each afternoon sitting for the answering of such questions. Debate is not allowed during this period, but an unsatisfactory answer may, if the matter is of sufficient urgency and importance, give rise to a motion for adjournment, so as to provide opportunity for discussion at a later period of the day.

The House can, on the motion of any member, obtain returns supplying such information on matters of public importance as is obtainable through departments of the Government. A motion for a return may be opposed on grounds of public policy, such as that the dis-

closure of the information sought is not for the public interest, or that its supply would involve unreasonable labor and expense, but much information thus sought is periodically supplied in the form of "unopposed returns." The Government can also, and frequently does, on its own initiative, lay papers before the House. Such papers are known as "Command Papers." These returns and papers, together with the returns presented in pursuance of directions contained in Acts of Parliament, and the Reports of Parliamentary Committees and of Royal Commissions, make up the formidable mass of official literature popularly known as "Blue Books."

But the principal opportunity for criticising the administrative action of the Government is afforded by the discussions in committee of supply, for which, as has been stated above, a minimum number of days must be set aside in each session. On the old principle that redress of grievances should precede the grant of supply, the action of each Minister and of the departments and officers over whom he has control, can be discussed on the vote for the branch of expenditure concerned. As has been seen, the House can reduce but cannot increase expenditure proposed by the Crown, and therefore any complaint made in committee of supply must be based on a motion for reduction of a vote, even, paradoxical as it may seem, though it be a complaint of insufficient expenditure. Other opportunities for criticising the action of the Government and raising questions of public policy are supplied by the debate, at the beginning of each session, on the address in reply to the speech from the throne, by debate on motions which must be made when the House first goes into committee of supply on the navy, army, and civil service estimates respectively, by the evening sittings appropriated to the discussion of private members' motions, by the second and third reading stages of the Consolidated Fund Bills and the Appropriation Bill, and by the motions which have to be made for the adjournment of the House over a recess.

A full account of parliamentary procedure would be impossible here. Some points have been touched on above, a few others may be briefly noted.

Each House has power to make its own orders, supplementing or modifying its customary rules of practice. A standing order continues in force until repealed. Other orders may be made for a particular session, for a more limited period, or for a particular occasion.

In the House of Commons any question of the law or practice of the House is decided, as a point of order, by the Speaker, or, in committee, by the chairman.

In the House of Commons, government business has precedence at most sittings, and Thursdays are usually devoted to committee of supply. Private members' bills have precedence on Fridays, and private members' motions have precedence, during part of the session, between 8.15 and 11 on the evenings of Tuesday and Wednesday.

The quorum of the House of Commons, and

of a committee of the whole House, is 40. (In the House of Lords the quorum is 3.)

A matter requiring the decision of the House or of a committee is decided by means of a question put from the chair on a motion proposed by a member.

If the opinion of the Speaker or chairman as to the decision of a question is challenged, he allows two minutes to elapse, in order to enable members to assemble, and then puts the question again. If his opinion is again challenged he directs the Ayes to go to the right and the Noes to the left, and appoints two tellers for each. The Ayes and Noes then pass through their respective division lobbies, on each side of the House, their names are taken down by the division clerks, and they are counted by the tellers, who announce the result at the table of the House.

If a debate on a question is unduly protracted, it can be terminated by means of what is called the closure, the procedure on which is as follows: A member rising in his place may claim to move "That the question be now put," and, unless it appears to the chair that the motion is an abuse of the rules of the House, or an infringement of the rights of the House, this preliminary question must be put forthwith, and, if it is carried, the main question is put forthwith and decided without amendment or debate. But a motion for the closure cannot be made unless the Speaker or the chairman of ways and means (or, in certain cases, his deputy) is in the chair, and is not carried unless it appears on a division that not less than 100 members voted in its support. The result is to leave to the chair discretion as to the time and circumstances in which closure should, with propriety, be granted.

The Speaker and chairman are also clothed with powers for checking irrelevance, prolixity, repetition and obstruction, for preventing the abuse of dilatory motions, and for maintaining order and decorum. If a member is guilty of grossly disorderly conduct, the Speaker or the chairman of a committee of the whole House can order him to withdraw from the House. If a member disregards the authority of the chair, or abuses the rules of the House by persistently and wilfully obstructing its business, he can be "named" for the offence by the Speaker or by the chairman of a committee of the whole House, and the House can, on motion made, make an order suspending him from the service of the House for the rest of the session. Orders of this kind, when made by the House, or by the Speaker or chairman, are enforced if necessary by the sergeant-at-arms with such assistance as may be required. In the case of grave disorder arising in the House, the Speaker may, if he thinks it necessary, adjourn the House without question put, or suspend the sitting.

The Parliament at Westminster is not only the oldest, but the mother of all existing Parliaments. Those who framed the constitution of the United States took the British constitution as their model, but studied it through the spectacles of Montesquieu, and thus brought about that separation between the executive and the legislative powers which makes such an essential difference between the British

House of Commons and the American Congress. English Parliamentary procedure has made the tour of the world. The rules adopted by the French assembly after the Restoration were based on a sketch of English parliamentary procedure supplied to Mirabeau by Dumont. The influence of English practice, derived either directly or through the medium of France, can be traced in the procedure of all Continental legislatures. Thomas Jefferson, when President of the United States, drew up for the use of Congress a manual consisting largely of extracts from English parliamentary precedents, and Jefferson's Manual is still an authoritative work. Every legislature of a British Colony conforms to the rules, forms, usages and practices of the British House of Commons, except so far as they have been locally modified. Of all parliamentary institutions throughout the world the Parliament at Westminster remains the archetype.

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COURTENAY ILBERT,

Clerk of the House of Commons.

10. Great Britain—Crown and Cabinet.

The crown is a chattel, and is kept in the Tower of London. But the genius of the British race, striving unconsciously toward the expression of national unity and permanence, has come to personify it as a power, which, though necessarily wielded by or in the name of an individual ruler, exists independently of the lives of kings and queens. The materials of which the crown is composed will outlast the lives of many rulers. Whilst they are mortal, is it not, in the strictest sense, immortal?

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The late Dr. Hearn pointed out, in his admirable work entitled 'The Government of England,' that, in spite of the progress toward democracy of the 19th century, the British Constitution remained, in a very real sense, a monarchy. Not only is it still true that, as regards all foreign communities, the Empire is represented by the monarch alone, and that it would be a gross breach of political etiquette for any person or body to attempt to open up any other channel of official communication with a foreign community, but it is equally true, that every internal act of State—legislative, executive, or judicial—both in the United Kingdom and in the dominions beyond the narrow seas, is done in the name of the monarch, and that no such act can be *ultra vires*. It is of the essence of the British conception of State sovereignty that the monarch is incapable of committing legal wrong.

This apparently Oriental dogma is, however, balanced by the equally fundamental doctrine, that for every political act of the monarch there is an appropriate agent, and that such agent acts at his peril. In some cases, the peril is remote and uncertain; in others it is prompt and definite. The Parliament which advises bad legislation is amenable only to the judgment of the electors expressed at the polls. The judge who abuses his office, though he may be dismissed by the monarch for actual illegality, is amenable, so far as the citizen is concerned, only to the vote of Parliament. But the executive official who breaks the law is liable to an action in the ordinary courts by the humblest citizen whom he has injured; and his plea of "superior orders," though it may involve the superior also in liability, will not absolve the actual delinquent. And thus, inasmuch as, in the enormous complexity of State action, it is hardly possible for the personal act of the monarch to reach the individual except through the hands of some intermediary, the subject is rarely without redress. Even the House of Lords, the greatest anomaly in the Constitution, can be made to feel the pressure of public opinion.

The Independence of Ministers.—The natural consequence of this fundamental principle of the responsibility of the Crown agent is the independence of the agent toward the Crown. Historically speaking, the claim of independence was first put forward by the judiciary, whose members, though for centuries both in law and in fact the servants of the monarch, liable to dismissal at pleasure, succeeded, before the end of the Middle Ages, in banishing the king from his own law courts, and in acting as an independent department of State. Down to the end of the 17th century, their success varied with the political balance of power; but it was assured, soon after the Revolution, by the Act of Settlement, which, in fact, made the judges independent of the Crown, though still, technically, liable to dismissal for actual misconduct.

Meanwhile, Parliament, a later institution than the courts of law, had, by a series of struggles which have made it famous in the world's history, succeeded, not merely in emancipating itself from the control of the monarch, but in establishing itself as an essential part of the national government. The history of these struggles is told elsewhere.

Here it is sufficient to remember that, on his restoration to the throne, Charles II. realized that Parliament could be cajoled, but could no longer be bullied. Even the enthusiastic loyalty of the Restoration Parliaments would not tolerate violence, though it fell a somewhat easy prey to the more sinister influence of corruption.

The Executive was much longer in securing its independence. Down to the Revolution, the holders of executive offices were, in fact as well as name, "His Majesty's servants." Outside legislation and judicature, the personal will of the king directed the policy of the country, subject only to the indirect check of a refusal by the House of Commons to grant supplies. But, with the accession of a foreign ruler, in the person of William III., and a renewal of the foreign element with the accession of the House of Brunswick, affairs rapidly changed. William was absorbed in great foreign schemes, and left home affairs to his Ministers. Anne was lethargic, and indifferent to matters which did not concern her personal comfort or the interests of the Church. George I. knew no English, and soon ceased to attend meetings of the Council, except purely formal meetings where his presence was absolutely essential. Thus the real control of affairs passed into the hands of the great officials of State.

At this point there was a real danger (not sufficiently appreciated by English historians) that the government of England would become a bureaucracy, each department in effect the private preserve of its chief, pursuing its way regardless of, or even in opposition to, the other departments, and intriguing for power and privilege. From this danger the country was saved by the peculiarities of the political situation, and by the financial power, based on long established tradition, of the House of Commons.

Ministers and the House of Commons.—During the first half of the 18th century, the dominating feature of the political situation was the possibility of a Jacobite restoration. So long as the throne was occupied by a daughter of James II., or even by the husband of one of those daughters, the country accepted the Revolution settlement with acquiescence, if not with enthusiasm. But, when it became clear that Anne would die childless, the hopes of the Jacobites revived. It was with difficulty that the Queen herself had been brought to accept the scheme of the Act of Settlement of 1700, by which the succession to the throne, on the failure of her issue, had been settled on the Princess Sophia of Hanover, the granddaughter in the female line of James I. The politically useful legend, that the "Old Pretender" (the son born to James II. on the eve of his flight) was a supposititious child, had long been exploded; the child himself, now a young man of winning personality, was prepared, at Anne's death to vindicate the claim which had passed to him on the death of his father; and the Queen was believed to sympathize fully with his ambitions. The House of Hanover was regarded as a mere stalking-horse for the ambitions of the Whig statesmen; and the first two of its princes to occupy the throne of Great Britain and Ireland were looked upon by the mass of the people as

foreigners. In 1715, and again in 1745, the fate of the throne trembled in the balance.

Thus the Ministers of George I. and George II. carried their lives, or at least their fortunes, in their hands. A Jacobite restoration meant, at the very least, banishment and confiscation for them, if not something worse. They could not afford to run unnecessary risks.

There can be little doubt that the Whig leaders would have been glad, in spite of their constitutional principles, to dispense with the presence of Parliament during these troubled years. Apart from the possibility—the probability—that it might result in an accession of strength to the Jacobites in the House of Commons, there was always the fear that the license of a General Election would be made the cover of a Jacobite *coup de main*. This fear is shown by the striking step taken soon after the accession of George I.; when the Parliament, at the urgent instigation of Ministers, prolonged the term of existence, not merely of its successors, but of itself, from three to seven years, by the Septennial Act of 1716.

Fortunately, however, it was not possible for the Whig leaders to dispense with the assistance of Parliament; and this for the good old reason which had for so long been the sheet-anchor of Parliament in its struggle for power. In spite of the large hereditary revenue settled upon the Crown at the Restoration, and the rich inheritance of the Crown lands, George I. and George II., like their predecessors, continually needed money; and the only stable source of money was a vote of the House of Commons. The chief secret of Walpole's favor at Court, as well as of his ascendancy over his colleagues, was the power which he possessed of securing this vote. For the first time in the history of England, the power of the Executive depended, openly though not officially, on the fluctuating moods of the representative House.

Gradually, then, by the teaching of events, the Ministers of George I. and George II. began to realize the conditions upon which Cabinet government depends for its success. It was necessary, if they were to prevent the commission of blunders which might bring down the dynasty and its supporters in one common ruin, that they should, in fact, control the action of the king. To secure this control, naturally very distasteful to monarchs brought up in the absolutist traditions of mediæval Germany, it was necessary that they should (under forms of deferential politeness) be able both to coerce and to bribe the occupant of the throne. So long as they acted as individuals, the former object was unattainable; for both George I. and George II. were quite shrewd enough to be able to play off one rival against another. But a threat of resignation by all his Ministers at once was more than a foreign ruler, ignorant of the temper of his subjects and of the machinery of government, could safely disregard. Equally was it desirable, if not essential, that Ministers, if they desired to bribe the king, should act together. For the means of bribery were only to be obtained from the House of Commons; and that House, though it doubtless regarded this new harmony of Ministers with deep suspicion, found it more difficult to refuse supplies demanded by the unanimous voice of the Government, than when it could plead as

an answer to the demands of one Minister, that his colleagues differed from him as to the wisdom of his plans. Thus gradually, from no very honorable motives, but as a mere counsel of expediency, Ministers acquired the habit of talking over their plans together; and the rival, and often openly quarrelling Ministers of William III. and Anne, were replaced by the Cabinets of George I. and his son. No doubt the unanimity, such as it was, was mainly superficial; but, for all that, in a matter wherein appearances counted for much, it was important.

The Modern Cabinet.—So much it seemed necessary to say to account for the appearance in English politics of a phenomenon so remarkable as the Cabinet, and so difficult to refer, for an explanation of its origin, to any particular crisis or any official document. Indeed one of the most striking features of the Cabinet system is its wholly informal character—a feature which adds both to its utility and to its interest as an object of study. It is natural, no doubt, that no one but those who have taken part in its proceedings should be able to speak authoritatively of the details of the working of a great political organ. But it is none the less curious that, until the appearance of the masterly essay of Bagehot, entitled 'The English Constitution,' in 1867, even the general outlines of the system by which they had in fact been governed for upwards of a century should have been unfamiliar to a people so keenly interested in politics as the British. And yet that such was the case is shown by the almost ludicrous difficulties experienced by the self-governing colonies of Australia, when, in the 50's, they endeavored to introduce it into their new Constitutions.

But here we must leave the historical method, passing by the vigorous but unsuccessful attempt of George III. to overturn a system which he thoroughly disliked, the brilliant new development introduced by Pitt in his gallant struggle against the coalition of Fox and North in 1784, the remonstrance made by Queen Victoria against the application of its principles to the famous "Bed-chamber" question in 1839, and the more successful vindication of her rights by the same monarch against Lord Palmerston in 1850. Let us make some attempt to enumerate the essential features of the system as it exists to-day.

Its Executive Character.—The first point to notice is, that the Cabinet is not a mere council of political experts, but a body of working administrators. With one or two exceptions, each of its members is actually responsible to Crown and Parliament for the conduct of some department of State. It is true that he is, almost invariably, chosen rather for his general political importance than for his skill in the affairs of his department, *i. e.* an office is found for him because his presence in the Cabinet is desirable. But, none the less, the official character of its members gives the Cabinet a power which no mere advisory council could ever exert. Not only is the Cabinet aware of the awkward secrets of public business, and the practical difficulties of carrying out any line of policy, it is its own executor; for, except in the improbable case of disloyalty to his colleagues, the Minister to whose department the carrying out of that policy belongs, at once in-

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sists upon its adoption by his subordinates, the officials of his department.

Its Parliamentary Influence.—In the second place, and still more important, the Cabinet wields vast Parliamentary influence. In effect, its members are invariably members of Parliament, though, legally speaking, no one of them need be; and most of them are men of commanding personal weight in the House of Commons. We have seen how the necessity of conciliating Parliament was forced upon the Ministers of George I. and George II. It is now fairly well understood that the influence exercised by those Ministers was obtained by means not the most creditable. But the death-blow to Parliamentary corruption, already checked by the Place Act of 1742, was dealt when Pitt appealed from the House of Commons to the country in 1784; and the *coup de grace* was given by the Reform Act of 1832. Since that date, the place of the old sinister influence of the "spoils" has been taken by the organization of the party system (see POLITICAL PARTIES); and the substitution of examination for patronage, in the vast mass of appointments to the permanent Civil Service, has rendered the working of the party system comparatively pure. For the most part, Ministers control Parliament by the support of followers who honestly believe their policy to be good, or, at least, the best available; and such corruption as exists is confined to the polling booths.

The Escape of 1705.—One of the most curious facts in the whole history of the Cabinet is that this control of Parliament by Ministers was very nearly becoming, so far at least as the House of Commons was concerned, a legal impossibility. The Act of Settlement of 1700 (so often alluded to) contained a clause expressly excluding from the representative House all holders of office under the Crown. This part of the Act, however, was not intended to take effect until the accession of the House of Hanover; and, before that date, it had been repealed by another Act of the year 1705. But neither the statesmen of 1700 nor those of 1705 appear to have had any idea of the importance of the question.

Dependence of the Cabinet on the House of Commons.—But it is of the first importance to remember that the influence of the Cabinet on Parliament is at least counter-balanced by the influence of Parliament on the Cabinet. Apart from the general attitude of the House of Commons toward Ministers, which is, of course, vital, the opportunities which occur in both Houses for criticising every action of the Executive are of daily occurrence during the session of Parliament. In fact, one of the chief cares of the Prime Minister in forming his Cabinet is to provide acceptable champions of its acts in either House. It is a constitutional maxim, that every Department must be represented in both Houses, so that there may always be present some responsible Minister to explain and give information upon any point of administration which any member of either House may choose to raise. This explanation and information are rendered chiefly in the form of answers to questions of which due notice has been given; and a glance at the Question-Paper for any day will reveal the vast and detailed

mass of information which Ministers must be prepared to supply to Parliament. A Minister can, of course, plead "reasons of State" for withholding information. But such a plea is apt to provoke suspicion; and if, for that or any other reason, the reply of a Minister is not considered satisfactory, further steps can be taken (such as a motion for adjournment, a proposal to reduce the Estimates, or even a vote of want of confidence), in order to impress upon a Cabinet the error of its ways. The discussion on the Budget is the grand opportunity for criticism of the Executive by Parliament; and, though the power is sometimes abused, it cannot be denied that the constant liability of Ministers to justify their conduct in Parliament is one of the most valuable principles of the Cabinet system.

But the essential character of that feature of the Cabinet system which we are now discussing, is best proved by the unquestioned rule of constitutional custom: that a Cabinet defeated on an actual vote in the House of Commons must instantly either resign or persuade the king to dissolve Parliament. The former alternative, established by the resignation of Walpole in 1742, on the apparently irrelevant question of the Chippenham election, was long thought to be the inevitable sequel of defeat in the House of Commons. But Pitt, in 1784, added the second alternative, with striking success. Whether the king is bound to grant a dissolution upon the request of a Cabinet, is a delicate question which is said to turn on the point whether the Cabinet was in office when the previous General Election occurred. If so, the country has pronounced its opinion; and the Cabinet is not entitled to a second verdict. Probably, however, the true doctrine is, that if there is any reasonable probability of the Cabinet securing a majority in the country, it is entitled to a dissolution. Needless to say, if the verdict of the polls is against it, the Ministry at once resigns, as Gladstone's Government did in 1874, and Lord Beaconsfield's in 1880. It may be incidentally remarked, that the fall of the Cabinet results in the resignation of about 30 other high officials, *e. g.* the law officers, the under-secretaries of State and the chief household officials, who, though not members of the Cabinet, are more or less in its confidence, and are, in contrast to the permanent officials of the civil service, "liable to retire from office on political grounds." These removable officials, together with the Cabinet, constitute the "Government" or "Ministry."

Informal Character of the Cabinet.—The third cardinal principle of the Cabinet system is its completely informal character. The Cabinet is indifferently described as a committee of Parliament and a committee of the Privy Council; but, in law it is neither. It is true that in each House of Parliament there is a Ministerial (not a Cabinet) bench; and that, in the House of Commons, the Cabinet wields a great and growing control over business. None the less, it is undoubted that its members sit by virtue of their membership of the House, and not by virtue of their offices, and that the measures which they propose, though commonly called "Government measures," are, with the exception of financial proposals, technically brought forward in their capacity of influential

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members of the House, and not as Crown officials. Even the King's Speech, though unquestionably drawn up by the Cabinet, is delivered in the House of Lords by the King himself or by special commissioners; while in the Commons it is read by the Speaker, who is not a Government official.

On its executive side, the Cabinet is equally informal. Its members are always made members of the Privy Council, in order that the oath of secrecy may be administered to them. But, as a body, it has no legal existence. It is never constituted by Order in Council, the Clerk of the Council is not present at its meetings, no minute or record of its proceedings is made, no decrees or orders are issued in its name, and it is never alluded to in Acts of Parliament, though the phrase "Responsible Minister of the Crown" is once or twice to be found in the Statute-Book. The various departments, such as the Admiralty and Treasury Boards, have, by tradition or statute, certain limited powers of issuing orders and regulations; but, in the vast majority of cases, the deliberations of the Cabinet appear in the guise of Orders in Council, *i. e.* commands of the King, issued by the advice of the Privy Council, or in the form of simple executive acts of the Crown, signified through the appropriate Minister. Both these classes of acts always receive the personal approval of the King, in whose name they are done, though the approval of the Privy Council is a pure formality.

The Unity of the Cabinet.—Fourthly, the unity of the Cabinet is expressed by the Prime Minister, though it is only within a very short time (January 1906) that the existence of the working head of the Ministry has been formally recognized, and that only by a place in the official Table of Precedence. No Prime Minister's department exists, though the Estimates have recently provided for two or three private secretaries. Like his colleagues, the Prime Minister is simply the holder of an executive post, though it is usual to appoint him to a well-paid sinecure, in order that he may have time to devote to the general policy of the Government. But even this practice is very recent. Walpole, who really created the position of Prime Minister, always declined to assume the designation; and the fiction was long maintained by the unwise practice of charging the holder of the position with the actual cares of a working department, such as the Foreign Office or the Exchequer.

And, even now, the precise relations between the Prime Minister and the Cabinet as a whole depend more upon the nice balance of circumstances than upon any well-defined tradition. The fact that the Prime Minister has been charged with the formation of the Ministry, a fact which in itself is usually (though not always) a consequence of his election as leader of his party whilst in Opposition, necessarily gives him a strong position with regard to his colleagues, who are, in a sense, his nominees. This advantage is strengthened by the rule that the collective decisions of the Cabinet are always communicated to the King by his mouth, whilst his prominence in the public eye tends also in the same direction. But the desirability of including in a Ministry the ablest

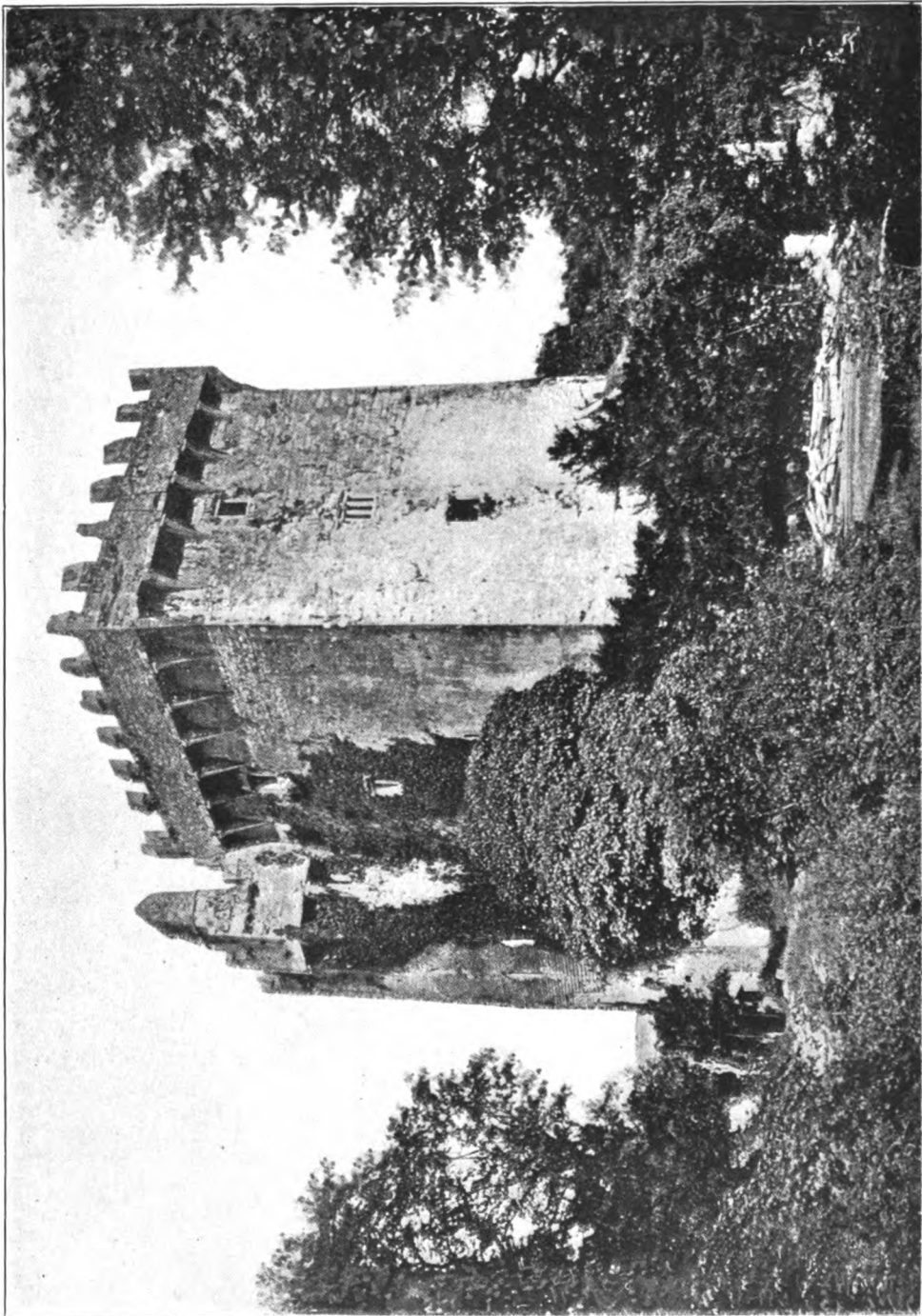
and most popular members of the party, the desire of avoiding any appearance of schism in the ranks of the Government, and the almost unfettered discretion conceded to individual Ministers in the administration of their own departments, upon the business of which they communicate directly with the King, all combine to prevent the leadership of the Prime Minister, in normal circumstances, solidifying into actual control. Whether this result is desirable or not, may be regarded as an open question. On the one hand, a weak Prime Minister is said to imply a weak Cabinet; and the moral is pointed by a reference to the history of the recent Balfour Government. On the other, a Prime Minister of overpowering strength is not without his drawbacks. It is often said, for example, that the Liberal Party was driven into its long exile in 1895, because, in the later days of his leadership, none of his colleagues was "able to stand up to Mr. G."

The Position of the Crown.—In concluding this brief sketch of the working of the Cabinet system, it may be well to anticipate a criticism which every succinct account of the working of British politics is likely to raise in the mind of a reader not himself personally familiar with its atmosphere. A foreign observer may well be expected to say, though it would hardly ever occur to a Briton to say: "What then is the use of the King, if he is merely the mouthpiece of his Ministers; if, except on the rarest occasions, he is bound to accept the advice tendered to him by his constitutional advisers? Does it not really seem as though the famous proposal for a 'cast-iron king' would fit the present British Constitution?"

The first answer to this criticism is the reminder that, though politics are an important side of public life in the British Empire, they do not by any means exhaust its interests. And the occupant of the throne is by no means confined to the sphere of politics. As the head of society, as the patron of religious, charitable, and scientific enterprises, as the encourager of art and sport, as the focus of that spectacular world which, even to the phlegmatic Briton, is no small share of his existence, the opportunities of the monarch are unlimited, and his personal discretion unfettered. To secure the presence of the King at any function, is to place success beyond the range of doubt. For the King to take a personal interest in the prosperity of a public enterprise, is the surest guarantee of its popularity. The recently organized King's Hospital Fund is but one of countless examples of this truth. And with all these matters the Cabinet has no concern.

But, even in the realm of politics, the King is very far from being the mere figure-head which superficial observers have sometimes supposed. It is true that the splendid service which the King renders to the State as the embodiment and symbol of the unity and permanence of a world-wide empire is, perhaps, the greatest of all the functions of the Crown; and, it may be added, there can hardly be any position more truly splendid, more worthy of the highest powers, more capable of being used as an instrument of good. Its singular value is that, while it affords scope for the powers of genius, the position is capable of being reasonably well filled by any man or woman of mod-

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BLARNEY CASTLE, IRELAND.

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erate ability and first-rate training, while even an unworthy holder cannot do very much harm in it. In other words, it is a position singularly well suited to an hereditary monarch.

And it would be a great mistake to assume that, even in the realm of politics, the function of the monarch is confined to the outward show of things, and has no place behind the scenes, where the real fates of nations are decided. Bagehot, in his work before referred to, has summarized, with his usual justice, the political rights to which a constitutional monarch, in a system like the British, is entitled. He has "the right to be consulted, the right to encourage, the right to warn." And, as the same writer very truly remarks, such rights, in the hands of a monarch of sense and sagacity, and it may be added, of experience, are singularly effective. In modern conditions, the air of a Court is by no means so fatal to width of outlook and knowledge of the world as in the days before the popular press and facile traveling. The late Queen Victoria, for example, was learning politics by instinct when many of her future Ministers were absorbed in the sports of youth or the narrow cares of professional life. Words of warning or encouragement must have fallen with singular force from her lips upon the ears of men upon whom rested the tremendous responsibilities of empire; while the completeness with which she could enforce her undoubted constitutional rights was shown in the famous letter in which she consigned Lord Palmerston to temporary oblivion in 1850. On that occasion Her Majesty simply insisted upon her undoubted right to be distinctly informed of every event, in contemplation or progress, which might result in an act of the Crown, "in order that she may as distinctly know to what she is giving her royal sanction."

Of late years suggestions have from time to time been made to the effect that the occupant of the throne should take a more personal and ostentatious part in the details of government. These suggestions not only savor of the political backwater, but they are singularly ill-advised in the interests of the monarchy. Britons feel so keenly upon political matters, that any one, however exalted, who takes part in controversial or debatable matters, inevitably meets with hostile criticism and periods of unpopularity. From such untoward accidents the Crown is entirely saved by virtue of its present unique position. Even where, as during the last two or three years of the Balfour Ministry, the policy of the Government was unpopular with the majority of the community, no one dreamed of blaming the King, for everyone assumed that he had nothing to do with it. How different was the attitude of the country to George III. during the long period in which he strove to restore the older type of monarchy. But perhaps the most complete testimony to the success of the present system, so far as the Crown is concerned, is the fact that republicanism, even as an academic ideal, has practically ceased to exist in the British Empire. Among all the schemes of political reform which are from time to time mooted, no one ever contemplates the disappearance or modification of the powers of the Crown; for the very good reason that the

Crown, so far from being a stumbling-block in the way of reform, is seen to be capable of being employed as a valuable instrument to secure it. The working of the Cabinet system makes the Crown a splendid fixed sun, surrounded by a constellation of rolling planets destined, from time to time, to disappear from sight. No one becomes tired of the sun, because the desire for occasional change, planted in every human breast, is satisfied by the appearance and disappearance of the planets. The Cabinet system may be open to severe criticism; but its defects will not be amended by any change which would reduce the monarch from his proud position as head of an united nation, to the leadership of a faction of irresponsible politicians, opposition to whom would mean opposition to the avowed personal wishes of the Crown.

Bibliography.—Considering its importance, very few writers have attempted to deal in detail with the history and working of the Cabinet system. The following works will be found useful in studying the subject. *History*: Morley, 'Walpole' (English Statesmen Series); Jenks, 'Parliamentary England' (Story of the Nations Series). *Working*: Bagehot, 'The English Constitution' (1872); Hearn, 'The Government of England' (chaps. viii-x); Anson, 'Law and Custom of the Constitution' (part II. The Crown, chap. iii. Oxford 1896); Traill, 'Central Government' (English Citizen Series).

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II. Great Britain — The Judicial System in England and Wales. The English judicial system, like the English law, grew up naturally and spontaneously. It is of native growth. It has never been constructed *en bloc* on any scientific or strictly logical principle; but it is perhaps none the worse for this. It still contains anomalies, which are relics of Anglo-Saxon custom or Norman feudalism; but such anomalies are historically interesting and do not at all seriously impede the working of the more modern machinery.

We now draw a sharp distinction between courts of civil and courts of criminal jurisdiction. In the former debtors are compelled to pay the money which they owe, and wrongdoers to compensate those whom they have injured; so that the proceedings, if successful, generally end in a judgment that the defendant shall pay the plaintiff so much money. The object of criminal proceedings, on the other hand, is to punish more serious offences and to prevent their repetition. Hence these proceedings, if successful, terminate in a sentence inflicting fine or imprisonment on the offender. And for each purpose we now have separate courts. This was not so formerly. At the time of the Norman conquest the most important tribunal in England was the Shire-gemot, or County Court. This court took cognizance of felonies, breaches of the peace, nuisances, and other offences which concerned the State, as well as of actions involving title to lands and other civil suits, which concerned only the individual suitors; it also heard appeals from inferior tribunals, such as the hundred

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court. In Saxon times the County Court met twice or thrice a year. In the 13th century in the larger counties it met every month.

Under Henry II. the royal power made itself felt throughout the kingdom. His justices in eyre made their circuits through the land, and tried the more important civil and criminal cases in the County Court. By the Assize of Clarendon (1166) all landholders were obliged to attend twice a year to meet the King's justices. This was the origin of the County Assizes. To this day the King's judges still come at least twice a year into every county in England. To the larger counties two judges come together, one of whom tries civil causes and the other criminal cases—

"The great judge and the little judge,
The judges of a size!"

From the ordinary meetings of this ancient County Court are descended both the County Quarter Sessions and the modern County Courts. At the Assizes any crime can be tried which has been committed within the county, whether treason, felony, or misdemeanor. At Quarter Sessions no crime can be tried, which is punishable with death or imprisonment for life (except burglary); other grave offences, such as perjury and forgery, are also excepted. These Sessions are held at least four times a year in each county; the justices of the peace for the county—unpaid laymen—are the judges.

The civil jurisdiction of the ancient County Court had become almost obsolete, when the County Courts Act of 1846 was passed. This act created the modern County Court, which is held in every town of any size in England, at least six times a year. Actions for breach of promise of marriage, libel, slander, and seduction cannot be commenced in the County Court; nor can actions of ejectment or any other action involving the title to any land worth more than £50 a year, or to any toll, fair, market, or franchise; nor any action of contract or tort, in which the plaintiff claims more than £100. There are 56 County Court judges; they are appointed by the Lord Chancellor, and must be barristers of at least seven years' standing.

So much for the counties. But even in Anglo-Saxon times, cities such as Winchester, York, and London had acquired the right of holding courts of their own in which an officer appointed by the citizens themselves would decide all civil disputes which arose within the limits of the city, and also exercise some criminal jurisdiction over the citizens. In less important towns, however, it was found difficult to exclude the jurisdiction of the County Court. But in the 13th and 14th centuries the policy of the Crown was to strengthen the towns in order to create a counterpoise to the power of the nobles. The three Edwards and Richard II. granted many charters to boroughs, which created borough courts of criminal and in some cases also of civil jurisdiction. The citizens were proud of these local courts, for they were a badge of their independence. Some of them have fallen into disuse; from the others are directly descended our present Borough Courts of Quarter Sessions and our civil Borough Courts of Record.

In 111 of the larger towns in England and Wales there is held at least four times a year a

Court of Quarter Sessions, which has the same criminal jurisdiction and adopts the same procedure as the Court of Quarter Sessions in a county. The judge of each of these courts is called a Recorder. He is the sole judge of the court, for although the justices of the peace for the borough are often present on the bench, they take no part in the proceedings. A Recorder is appointed by the Crown on the recommendation of the Home Secretary. He must be a barrister of not less than five years' standing. He is *ex officio* a justice of the peace for the borough. He may sit in Parliament for any other constituency but not for the borough for which he is Recorder.

In 18 of the largest cities or towns there exists also a Borough Court of Record of civil jurisdiction—such for instance as the Mayor's Court, London; the Court of Passage at Liverpool; the Salford Court of Record, and the Tolzey Court at Bristol. The jurisdiction of these courts is generally limited to causes of action arising within the borough, but unlimited as to the amount which can be claimed in the action. In most of them the Recorder of the borough is the judge.

When our Plantagenet kings were firmly established on the throne, judicial power became more centralized. The King's Council gradually extended the scope of its operations. It acquired important judicial functions; it became a court in which the King, in theory, was always present. From this council sprang gradually the courts of King's Bench, Common Pleas, and Exchequer; which for many centuries were the three Superior Courts of Common Law at Westminster.

Then as civilization advanced, it was found that the rigid rules of the common law required modification to meet special cases. Ancient custom had to yield to improved morality. The Lord Chancellor, who was at first an ecclesiastic, became "the keeper of the King's conscience." He presided over the Court of Chancery, which soon assumed power to restrain suitors from "unconscientiously" enforcing their strict legal rights. This Court of Equity, which usually sat in Lincoln's Inn, thus acquired control over the three courts of law at Westminster. Two systems of judicature in fact flourished side by side, which were in many respects at variance with each other. What was right at law was often wrong in equity. Judgment would be given on the same facts for the plaintiff in Westminster Hall, for the defendant at Lincoln's Inn.

By the end of the 18th century the Court of Chancery had become more technical, if that were possible, than the courts of common law themselves; its procedure had ceased to be elastic; it would only grant relief in certain specified cases. A plaintiff, who had undoubtedly a strong moral claim, was constantly told that he had no equity. And both at law and in equity, cumbrous procedure, technical pleadings, and preposterous rules of evidence caused the suitors much vexation of spirit, much unnecessary expense, and worst of all, intolerable delay. "Lord Eldon and the Court of Chancery pressed heavily upon mankind" (Bagehot).

Attempts were made from time to time to deal with this state of things by legislation—notably by the Common Law Procedure Acts of 1852

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and 1854, the Chancery Procedure Act, 1852, and the Consolidated Orders in Chancery of 1845 and 1860. At last in 1873, Lord Selborne, then Lord Chancellor, with the assistance of Lord Cairns, his opponent in politics, carried successfully through Parliament the Judicature Act, which came into force on 2 Nov. 1875. This Act created the Supreme Court of Judicature, which administers law and equity concurrently. Its procedure is straightforward and simple. Every court now applies the same principles of law and equity to the actual facts of the case; every court has power to grant whatever form of relief the nature of the case may require, whether legal or equitable. This was the greatest and most beneficial law reform of Queen Victoria's long reign. On 4 Dec. 1882, outward expression was given to this fusion of law and equity by physically uniting the courts in one building—the new Royal Courts of Justice.

The Supreme Court of Judicature is composed of the Court of Appeal, and the High Court of Justice. Thus the civil courts at present are: The County Court, the Borough Court of Record, the High Court of Justice, the Court of Appeal, the House of Lords, and the Judicial Committee of the Privy Council. The High Court of Justice is divided into the Chancery Division, the King's Bench Division, and the Probate, Divorce, and Admiralty Division.

The Chancery Division has now six judges who work in pairs, each pair having four masters and a staff of clerks working under them. The bulk of the work of the Chancery Division consists of the equity business, to which its organization is especially adapted. Its powers are, nevertheless, not confined to any particular subject-matter; it administers law as well as equity, though it never tries a case with a jury.

The Lord Chief Justice of England, assisted by 14 puisne (*i. e.* junior) judges, conducts the business of the King's Bench Division. These judges try civil causes either with or without a jury; they preside at the Assizes, civil and criminal, all over England and Wales; they hear appeals from County Courts and magistrates, and prohibit all inferior tribunals from exceeding their jurisdiction.

In the Probate, Divorce, and Admiralty Division, there are two judges who decide as to the validity of wills, grant divorces, and manage the admiralty business of the country.

The rules of court made under the Judicature Act have defined the procedure in the High Court of Justice, which is simple and elastic. A Master now decides all interlocutory matters on a summons for directions, *e. g.* whether the action shall proceed with or without pleadings, with or without a formal trial, with or without discovery of documents and interrogatories as the nature of the case requires. Every amendment in any record, pleading, or proceeding that is requisite for the purpose of deciding the real matter in controversy can be made at any stage of the proceeding.

The Court of Appeal is composed of the Master of the Rolls and five Lords Justices, with the occasional assistance of the Lord Chancellor, the Lord Chief Justice of England, and the President of the Probate, Divorce, and Admiralty Division.

The Lord Chief Justice of England, the Master of the Rolls, and the Lords Justices are appointed by the Prime Minister; the puisne judges of the High Court of Justice are appointed by the Lord Chancellor.

From the decision of the Court of Appeal, appeal lies to the House of Lords—to the judicial body known by this name, not to the legislative assembly. An ordinary peer of the realm can no longer sit in the House of Lords when it is exercising judicial functions. The Judicial Committee of the Privy Council hears appeals in ecclesiastical matters and also from the Colonies. These appellate courts will probably soon be merged in one; they have been strengthened by the appointment of four paid Lords of Appeal.

The criminal courts now are: The Magistrate's Court, the Borough Quarter Sessions, the County Quarter Sessions, the Assizes, the Central Criminal Court, the King's Bench Division of the High Court of Justice, and the Court for the consideration of Crown Cases Reserved.

The proceedings usually commence with a *summons*, bidding the accused appear in court before the magistrates on a certain day; in some cases a *warrant* will be issued at once for his arrest. Simple matters are disposed of summarily by the magistrates. Graver cases are sent for trial to Quarter Sessions or to the Assizes. In these graver cases, the prosecution states in detail the precise charge against the prisoner in a pleading which is called an *indictment*. This is laid before a *grand jury*; and the accused will not be put on his trial unless the grand jury think that there is a case against him fit to be tried. If the grand jury is of this opinion they return the indictment into court, marked "True bill," and the prisoner is then *arraigned*. In some few cases the prisoner must state his defence in a written *plea*; but, as a rule, he merely pleads "guilty" or "not guilty" orally from the dock. If he pleads "guilty," or if after pleading "not guilty" he is tried and convicted, he may be sentenced to fine, imprisonment, or death, according to the nature of the crime which he has committed.

The Central Criminal Court—better known as the Old Bailey—tries all treasons, felonies, and misdemeanors committed in the Metropolitan district or within the jurisdiction of the admiralty. The lighter crimes are usually disposed of by the Recorder of London or the Common Sergeant; the graver by a judge of the High Court, who attends for the purpose. This court is at once both Assizes and Quarter Sessions for the city of London, and assizes for the counties of London and Middlesex and for certain specified portions of the counties of Essex, Kent, and Surrey.

The King's Bench Division occasionally exercises jurisdiction as a court of first instance in cases of grave public importance, such as the trials at bar of Dr. Jameson and Col. Lynch in 1806 and 1903 respectively. It also has an appellate jurisdiction over cases brought before it on writs of error or certiorari or on "special cases" stated by justices of the peace.

The Court for the consideration of Crown Cases Reserved is at present the only criminal court of appeal. It deals only with points of law submitted to it by the judge, who presided at the trial. There is no appeal where the prisoner has

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been acquitted. The court consists of at least five judges of the High Court of Justice, of whom the Lord Chief Justice of England must be one, unless he is prevented from attending by illness.

In the County Court and before magistrates, solicitors act as advocates. In all the other Courts only barristers can be heard at the actual trial, or on "appeal"; though solicitors are allowed to argue minor questions in Judges' Chambers. A barrister must be a member of an Inn of Court; he must have passed the Bar Examinations, and then have been "called to the bar" by his Inn. The four Inns of Court in London possess the monopoly of calling men to the bar; they will not "call" any woman. In litigation in the High Court it is necessary to employ both a solicitor and a barrister; the solicitor prepares the case for trial, and "instructs" the barrister by delivering a "brief" to him. Solicitors also dispose of a vast amount of non-litigious business. Every solicitor must have been articled to a solicitor for at least three years, and must have passed the Solicitors' Examinations at the Law Institution in Chancery Lane, London, W. C.

For further information the reader is referred to Odgers on 'Pleading and Practice,' 6th ed. 1906 (London); Kenny's 'Outlines of the Criminal Law,' 2d ed. 1904 (Cambridge); Broom's 'Common Law,' 9th ed. 1896 (London); 'A Century of Law Reform,' 1901 (London), and Odgers on 'Local Government,' 2d ed. 1906 (London).

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12. Great Britain — Local Government.

As in other large and populous countries, the work of government in England* is classified as being either national or local. This classification has no reference to the place in which the work is done or to the area benefited; in England at any rate, it is based in practice — whatever may have been its origin — exclusively on the systems upon which these two branches of public administration are organized and controlled. That part of the work of government which is undertaken by the national organization of the state, directed from its capital, and administered under the direct orders of its executive head or principal legislature is termed national government; and is, indeed, by historians, politicians, and citizens alike, often exclusively thought of as government. That part which is left to subordinate organizations, relating only to particular geographical areas within the state; and which is immediately directed by and responsible to authorities belonging to those areas, subject only to more or less supervision, help, and superior control by the national government, is termed local government. In England and Wales, even more than in most other countries, the choice of the particular functions of government to be thus left to local authorities, and the amount and kind of the supervision, help, and superior con-

trol exercised by the national government in respect of each of these functions, have been determined rather by historical antecedents than by any consistent or logical theory. The aggregate amount, variety and relative importance of local government has, during the past half century, steadily increased; until it has come in the United Kingdom, nearly to equal in magnitude (measured by the annual cost of administration) that of the national government itself. This increase has not been due to any transfer of services from the sphere of national to that of local government. Such few transfers as have occurred (like that of the prisons in 1877) have been actually in the other direction. The enormous development of English local government which has marked the last half century has been due, partly, to the great expansion of the cities, which need more government than rural districts, partly to the progressive demand for new and increased services such as schools and libraries, and partly to the tendency to transfer the administration of services of common use from the sphere of private to that of public — usually local — administration.

THE SERVICES ADMINISTERED BY LOCAL AUTHORITIES.

The government at present entrusted to local authorities in England and Wales may be divided into four great classes, which we may term respectively the collective organization of public services, the collective regulation of individual conduct, the collective provision for special classes of the community, and the collective taxation upon individual citizens by which the net cost of the whole of the local government work is met. It has been a consequence of the great development of local government during the past half century, and of the absence of any logical or deliberately thought out plan of organization, that this or any other systematic analysis of local government functions does not correspond exactly with any definite classification of local governing bodies. We must therefore describe separately function and structure.

The collective organization of public services, though later in its great development than some other branches, now makes up the largest part of English local government.

1. *Protection.* — We have first the fundamental service of the protection of the individual citizen against aggression, for which there is, from one end of England to the other — not excluding even the most rural or the most desolate regions — a series of salaried, professional and highly organized local forces of preventive police. In marked contrast with the practice of most other European countries (and, indeed, with that of Ireland), these police forces, 187 in number, are (with the exception of that for the metropolitan area) exclusively under the control of the respective local authorities, and are subject neither to orders from, nor to control by the national executive. They are (outside the metropolitan area) entirely appointed, controlled, and paid by particular local authorities; in municipal boroughs, the town councils by their "watch committees"; in counties, by what are known as "standing joint committees," of which half the members are chosen by the County Council and half by the Justices of the Peace in Quarter Sessions. The total cost of mainte-

* With England is included Wales and the Scilly Isles, but not Scotland or Ireland, which have entirely distinct systems of local government; as have also the Channel Isles and the Isle of Man.

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nance of the provincial police forces is three and one third million pounds, and that of the two metropolitan forces two and one quarter million pounds per annum, for which 44,000 men are maintained. A separate grant of part of this cost (at first a quarter, latterly one half) was long made from the national exchequer, conditionally on the local authority (1) permitting the Home Secretary to have its force inspected annually by an officer appointed for the purpose, (2) maintaining it at such a standard of strength and efficiency as the Home Secretary might consider satisfactory. No separate police grant is now made, the amounts (aggregating £3,000,000 per annum) having been merged in larger general contributions in aid of local authorities; but a certificate by the Home Secretary that the above conditions have been fulfilled is still annually required before payment is made. In the metropolitan district (which for this purpose extends to an area of more than 15 miles radius from Charing Cross) there are two police forces; one of small size, maintained by the Corporation of the City of London, without exchequer aid or Home Office inspection, for the protection of the one square mile of the old city; and the other the largest in the world, organized as a local force, but commanded without any shadow of local control, by officers appointed by the national executive itself (Home Office); at the cost, partly of a fixed local rate of five pence in the pound, which meets about half the expense, and partly of the national exchequer; for the protection of the 900 square miles of the metropolitan area. ('Annual Home Office Reports as to Police'; 'History of Police in England,' by W. L. M. Lee, 1902.)

While the central courts of justice form part of the national government, some of the minor tribunals are (though the judges are never elective) supplied by local government, either in form of (a) petty criminal courts held by the local justices of the peace; (b) the more important Courts of Quarter Sessions, held by the same; (c) stipendiary police magistrates in various cities, appointed by the national executive, but paid for by the cities themselves; and (d) a few local civil courts maintained in the City of London and some other of the older cities. The stipendiary police magistrates in the metropolitan district (outside the old city) are maintained in the same way as the metropolitan police force. ('Justice and Police,' by F. W. Maitland.)

Protection from fire is afforded by separately organized fire brigades, having no connection with the police. These are in all cases exclusively under the control of the local authorities; in London, the County Council; in the municipal boroughs, the Municipal Corporation; in other places, the Urban District Council, or the Parish Council. In London, the fire brigade is second in size and cost only to that of New York, and it is not clear whether, for the particular conditions of its task, its efficiency is second to that of any in the world. Its strength is 1,375 men, and its cost £240,000 per annum, toward which the fire insurance companies have to contribute a trifling percentage of the value they severally insure in London, and the national exchequer unconditionally contributes £10,000 a year in respect of the large

amount of national property in the metropolis. Some of the provincial cities have also salaried professional fire brigades, often highly efficient. In less populous centres, according to the unfettered discretion of the particular local authority in each case, the fire protection passes by insensible gradations (some salaried professionals, men in other occupations partially paid for fire service, or unpaid but organized volunteers) down to the mere provision of a hand pump or buckets, to be used by any zealous citizen. Protection against fire in theatres and music halls, and against such methods of building houses generally as might facilitate dangerous fires, is afforded, in the metropolis, by the stringent regulations and inspection by the London County Council under its special building act. In other towns the Municipal Corporation takes such action of a similar kind as it thinks fit, by way of by-laws. Protection against drowning is afforded in the bathing season by the boats and boatmen provided by only a few seaside municipal corporations.

2. *Locomotion*.—In so far as locomotion is not abandoned to private enterprise (railways, most river steamers, some tramways, omnibuses, etc.), the whole provision for this service is left in England to the local authorities. The maintenance of roads is performed, over every part of England and Wales, by one kind of local governing body or another. Within London, it is the council of the particular metropolitan borough; in the municipal boroughs, it is the corporation; in other towns, it is the urban district council; and wherever none of these authorities exists, it is the rural district council which is responsible for this service. The method and standard adopted in each locality is left to the unfettered discretion of its local authority, which (for the 95,177 miles of by-roads) has itself to bear all the expense. But for what are deemed main roads (apart from London and the principal cities which are called county boroughs), the county council either itself undertakes the service or else contributes to the minor local authority a sum agreed between them as the cost of keeping up such main roads, of which there are 27,367 miles. The average amount per mile annually spent on road maintenance is main roads, £60; by-roads, £20. The county council, outside London and the county boroughs, moreover, maintain the bridges over streams, etc., with some exceptions. Where, as in urban districts, the road becomes a street, its maintenance naturally becomes more costly, and altogether new needs of paving, cleansing, and lighting arise, to be dealt with and paid for in each case by the local authority concerned, at its unfettered discretion. Further developments of the same service, undertaken under special powers, are the short lengths of canal of the Exeter and York municipal corporations, and the extensive canal navigation owned and operated by the Gloucestershire county council; the harbors, piers, and docks maintained by about 50 local authorities; the numerous bridges over the Thames, constructed and maintained partly by the Corporation of the City of London, partly by the London County Council; similar bridges over rivers in other cities nearly always maintained by the local municipal corporation; the great

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tunnels under the Thames constructed by the London County Council; a few old-fashioned ferry services maintained (as at Saltash, Middlesbrough, and Sunderland) by various local authorities; the development of the ferry into a moving "floating bridge" by the corporation of Southampton; and into river steamboat services across the Mersey by the Corporation of Birkenhead; across the Thames at Woolwich by the London County Council; and up and down the Thames by the same local authority. In other directions the road has been developed into a tramway; and cars—horse, steam, or electric—are now (1906) owned by about fifty local authorities, and operated under municipal management by an ever increasing number of them (in 1906 over 30), including the valuable hundred miles of track already worked by the London County Council, with gross receipts from fares which, in a normal year of full electric working, may be put at more than £1,500,000 sterling. In one or two cities the municipal corporation has obtained exceptional power to run an omnibus service in conjunction with the tramways. In all other cases the omnibus service, together with either the ownership and management of the tramway service, or else its operation under terminable lease from the local authority, is left to private enterprise. A few bridges constructed by groups of capitalists, with power to charge tolls, are still in the same position, as are most of the canals, and all the railways and coast steamboats. The 19th century has seen a marked tendency toward freeing from toll the use of the various means of locomotion maintained by local authorities. Their roads and streets—once barred to all but pedestrians by tollgates—are now invariably free; the bridges, on many of which even pedestrians were charged a toll, are now (with the exception of a few capitalistic ventures, still in private hands) uniformly free; the tunnels under the Thames are free to vehicles as well as to pedestrians; the steamboat service by which the London County Council maintains the Woolwich ferry is equally free; while the tendency in the municipal tramway canal and steamboat services is to charge only the smallest fares or tolls.

3. *Water Supply.*—The supply of water is only in a steadily diminishing number of cities, of which the largest are Bristol and Newcastle, a matter for private enterprise. In a couple of hundred cities this public service is in the hands of the local authority, usually the municipal corporation, or (as in the metropolitan district), of a council made up of representatives of different local authorities, the aggregate amount of capital invested in these public water enterprises being about £100,000,000 sterling. It is now generally thought to be a defect that there is no systematic distribution, among the great centres of population, of the natural water basins; and no local authorities entitled to control them.

4. *Heat, Light, and Power.*—Gas for lighting, heating, and power is produced and supplied, under the authority of separate statutes, in about 670 cities and towns, besides a number of smaller installations started without statutory powers. These gas works were, in their origin, mostly private enterprises (though the local governing body of Manchester started its

own gas works in 1816), but there has been a steady tendency to municipalization, until 210 towns now (1906) govern their own gas production, with a capital of £40,000,000 sterling invested in their enterprises. During the last quarter of a century on an average five cities a year have municipalized their gas supply; and as these comprise a majority of the smaller consumers, no less than 46 per cent of the entire number of the users of gas in the United Kingdom are thus co-operatively supplied by themselves as citizens (Annual Returns as to Gas Works, Board of Trade). Electricity, starting only within the past quarter of a century, has been even more predominately a matter of municipal enterprise. More than 100 towns have their own municipal electricity supply, in which some £25,000,000 sterling is now invested. In Manchester the municipal corporation supplies also hydraulic power.

5. *Education.*—The extensive public service of education—as a function of local government scarcely a generation old—now makes up more than a sixth of the total expenditure of the local authorities. While the national executive, by contributing about a third of this expenditure on education, exercises great influence by means of the conditions which it attaches to its grants, the power of the local authorities to provide what kind and what amount of educational facilities they deem fit over and above the national minimum, is (so far as secular subjects are concerned) now practically unlimited. There is no limit to their current expenditure, or to the amount of rate they may levy. There is no limit of grade or of age. Anything that is education—whether elementary, secondary, or university in grade; whether infant or adult; whether literary, scientific, artistic, technological, or professional in kind—the local authority may, if it chooses, provide, without requiring any sanction or approval, in whatever way it chooses, under whatever regulations it chooses, gratuitously or at any fee. It is legally restrained only (1) by the statutory exclusion (or only conditional admission) of religious instruction in the nature of a catechism distinctive of any particular denomination; (2) by the statutory obligation to provide the "national minimum" of efficient elementary schools for all children between 5 and 14 requiring elementary instruction; (3) by the need for sanction of any projects for raising funds by loans. In practice, the dislike of the citizens to an undue increase in the rates restrains the local authorities at present to a comparatively limited use of their vast powers. While elementary schools, of one sort or another,—now always free and compulsorily attended—exist in adequate numbers, there is, as yet, a quite insufficient supply of secondary schools, apart from those maintained from ancient endowments, under separate governing bodies; and whilst, in most cities, much has been done for technological education of an elementary grade, the provision for university education and the higher technological instruction is, compared with the need, still only rudimentary. For everything above the elementary school, fees are charged. On the other hand, London has a "scholarship ladder" unequalled in extent and genuine accessibility anywhere in the world. By an unlimited provision of free

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places coupled with maintenance allowances, awarded on a merely qualifying examination, the opportunity for secondary and university education is effectively opened even to the poorest child of more than average ability. Other local authorities have less extensive scholarship schemes on similar lines.

6. *Miscellaneous Services.*—Brevity compels the grouping together of a large number of diverse public services organized and administered by local authorities. With the exception of a few ancient chartered rights in the hands of private owners (of which Covent Garden in London is by far the most important), the markets are in public ownership, involving a total capital of some £7,000,000 sterling, and (while a few are leased) usually under public administration; often including warehouse accommodation, weighing machines, sometimes cold-storage and abattoir. The municipal provision of workmen's blocks in towns and of cottages in the country has been carried on to a great extent, not only by the London County Council, which has already (1906) over 20,000 people in its dwellings, but also by about 50 other authorities. ('The Housing Handbook,' by W. Thompson, 1904.) The existence of a few "joint-stock" cemeteries serves to remind us that the provision and management of burial grounds is an important function of the local authorities, in which millions of capital is invested, extending in one or two cases (as at Hull), to the provision of crematoria. Interment is, however, the business of the undertaker, and remains everywhere in private hands; not even subjected, as is the case in some continental cities, to public control. The provision of parks and recreation grounds, with bands of music, gymnasia, facilities for games, etc., has been lavishly undertaken. Hundreds of cities and towns have free public libraries and reading rooms; others have also public picture galleries and museums which are uniformly free; whilst a couple of hundred places provide for their citizens swimming and other baths, and public laundries, at low fees. Among the other miscellaneous public services maintained by English local authorities are the Bradford "conditioning house," or wool-grading establishment, the Burnley municipal cold storage, the Doncaster race course, and the Battersea and Saint Helen's municipal supplies of sterilized milk. The tendency of local authorities to embark in these enterprises has led to a discussion of what is called "municipal trading," during which municipalization has proceeded at a greater rate than ever. (For the abstract case against this tendency, consult 'Municipal Trade,' by L. Darwin (1903); for an equally abstract defence, 'The Commonsense of Municipal Trading,' by G. Bernard Shaw (1904), and 'Mind Your Own Business,' by R. B. Suthers (1905); for statistics, 'The Municipal Year-book' and 'The London Manual' (both annually); the seven volumes of 'Local Taxation Returns' annually published by the Local Government Board; and the periodical return of 'Reproductive Undertakings carried on by Municipal Boroughs,' also issued by that office.) In 1906 the amount of capital under municipal management cannot be put at less than £500,000,000 sterling; the aggregate municipal indebtedness (all repayable within 20 to 60

years), being over £400,000,000 sterling. Manchester and Birmingham have over £20 per head of population of capital under municipal management.

The part played by local government authorities in England in the collective regulation of individual conduct is less conspicuous than their organization of municipal services, but it is too important to be ignored. It is not merely that practically all these authorities exercise, in their power of making by-laws, a minor legislative function, on which we to a great extent depend for the prevention and suppression of nuisances, the regulation of the streets, all the ramifications of public health, and the operations of building and various noxious trades. If, as in England we must, we include among local authorities the justices of the peace, the regulation of the sale of alcoholic drink, the places where it may be sold, and to some slight extent the hours during which the sale may take place, fall within the discretion of local governing bodies. Finally, in the direction and control of all the provincial police forces, the local authorities have virtually extensive and scarcely defined opportunities of supervising and restraining any overt manifestations of individual conduct which is "disorderly" in character, and of which local public opinion disapproves.

The collective provision for special classes of the community is one of the oldest and was, until lately, the most costly of the functions of local government in England. Under the comprehensive term of the Poor Law there is now included a whole array of specialized provisions for orphan and deserted children, for the sick, for persons of unsound mind, for physical and mental "defectives," for the aged and infirm, and for the men and women who become destitute, together with their children. The total amount spent on this service is about £15,000,000 sterling annually. Beyond the ancient limits of the Poor Law, and still within the sphere of local government, we have, in addition, the provision of hospitals for lunatics, idiots, and epileptics; the costly arrangements for maintaining and medically treating those suffering from any infectious disease; and the organized provision now made for the temporarily unemployed—making an aggregate annual expenditure from public funds on the care of particularly distressed or afflicted classes of the community, falling not far short of £20,000,000 sterling.

The taxation by which the local authorities maintain all these services (apart from the revenue of municipal property, the receipts from municipal services and contributions from the national exchequer), is levied entirely by themselves. They cannot create a new tax, but once the kind of impost is authorized by Parliament, the rate at which the citizen shall be charged is, as a rule, left to the unrestrained discretion of the local governing body. In amount, there is no limit to its taxing power. Of the total gross revenues of the English local authorities, which may (1906) be put at about £110,000,000 sterling, about 14,000,000 is received from the national exchequer, leaving some 96,000,000 to be raised locally. Of this nearly 30,000,000 is derived from the receipts from the various municipal enterprises that we have described, 3,000,000 from other municipal property, 1,000,000 from fines and fees, and 5,000,000 in reimbursements

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and miscellaneous receipts, leaving about 57,000,000 to be raised by local taxation. Tolls and dues (apart from those connected with markets and harbors) yield less than 500,000. The whole of the balance is found by one tax, the so-called "rate," a periodical levy, upon the occupiers of the real estate within the area of each local authority, of a specified proportionate part of the assessed annual value of that real estate. This universal impost, known as the Local Rate (sometimes as the Poor Rate, the District Rate, the Police Rate, etc.), varies widely from place to place, but is most commonly between two and eight shillings in the pound, or between 10 and 40 per cent of the annual rental. The actual average for all purposes, including both urban and rural areas, is (1906) about three shillings and sixpence in the pound, equivalent to an annual levy on the capital value of the real estate of less than one per cent, and to an annual contribution per head of population of about 17 shillings and sixpence. It is an interesting and little known statistical fact that the amount of this local taxation per head is only about the same as it was a century ago. This local tax is legally payable by the occupier of every house or farm, or other separate holding of real estate, who (if, as is commonly the case, he is not himself the owner), is left to make his own contractual relation with the owner or "landlord;" normally the occupier pays the rates in addition to his rent. But in "flats" forming part of large blocks, and in property of small annual value, especially that let by the week, the owner usually "compounds" with the local authority, in consideration of a discount to pay the rates himself instead of throwing the burden on the occupier (the so-called "compound householder"), whose rent then includes both rent and rates.

LOCAL GOVERNING BODIES.

English local government is everywhere, and for all purposes, carried on by one particular form of political machinery, which to the Englishman seems so inevitable that he seldom thinks of describing it. The powers and duties of government are vested, not in any officers personally, but in a board or council of members, having jurisdiction, for specific branches of administration, over a definite area. This governing body, which is uniformly unpaid and composed of citizens more or less engaged in their own avocations, appoints, supervises, and directs a staff of salaried, professional officers (the "municipal civil service"), by whom the actual functions are performed. The staff of salaried officers is invariably appointed by the governing body; and (though service is nominally only during pleasure), the appointments are habitually permanent, terminable only on misconduct. There is no such thing in English local government as removal for political reasons, or in order to make a vacancy. The board or council acts collectively, by resolutions agreed to at its meetings by a majority of the members present. Its deliberations are presided over by one of its own number, called chairman or mayor, whom it freely elects; and not by a person separately elected by the people for the presidential position, or appointed to it by some outside authority. Perhaps for this reason, it is a distinctive feature in English

local governing bodies that the presiding member has but little personal power or responsibility, apart from presiding. Though in practice he often exercises out of sessions, some executive power, by giving orders to the salaried staff, this is always done in the name of the board or council, and subject to its ratification. The board or council habitually divides itself into committees, each charged with the supervision of a particular branch of the government, and required to report to the main body. The result is an intimate combination of legislative, executive, and occasionally even judicial operations, which the Englishman takes for granted as "administration." It may be added that national politics have little influence on local government. The salaried staff is almost universally "out of politics." In many cases, perhaps the majority, the elections are not contested on political grounds, or seriously fought by the political organizations. In London and many of the large boroughs, the elections are thus fought, but the issues are not primarily those of national politics, nor is the cleavage of opinion exactly the same. And once elected, the members (even where the contests have been keen) seldom habitually allow their politics or party divisions to affect their municipal administration.

The organization of local government in England, once extremely complicated, has been much simplified by recent statutes. The era of reform began, indeed, in 1834-35, when the ancient municipal corporations were made elective and systematized, and the Poor Law was placed in the hands of elective Boards of Guardians. Between 1848 and 1875, a system of elective rural and urban district councils was created principally for sanitation and roads. In 1888, the county councils were established on an elective basis, to take over from the nonelective justices of the peace the civil administration of the counties. In 1894, the rural parishes were provided with elective parish councils; and in 1900 the different parts of London with metropolitan borough councils. By these successive statutes every part of England and Wales has been placed under local governing bodies annually or triennially elected on the widest possible residential qualification, women having a vote whenever they are independent householders, and being eligible for election to all but town and county councils. There is, speaking broadly, no property qualification for election, and (unlike the English parliamentary balloting) no obligation on the candidate to provide the election expenses. The members of the local governing bodies receive no salary or other remuneration for their work. Only very exceptionally, in positions such as the mayoralty of an important city, is any allowance paid even for expenses.

In spite of simplifying statutes, English local government is still shared among various strata of different authorities, constituted for different purposes under different statutes. London, moreover, with its 4,750,000 of inhabitants, has a local government of its own, and must be considered apart. We take first the network of local authorities administering the more obvious services of municipal government, including sanitation and education. To begin with the parish, we see this ancient ecclesiastical area in the rural districts forming the

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lowest unit of government; administered, if small, by the parish meeting open to all adults; if large, by a parish council triennially elected by the householders. The parish meeting or parish council may light the village, protect the footpaths and village green, establish libraries and reading rooms, baths and public laundries; but its power to tax is limited. Next to it stands the rural district council, dealing with roads and sanitation, triennially elected by and acting for the householders of a group of parishes. Places in which the population has become aggregated together, needing greater and more varied local government services, are (by Local Government Board order) given the status of urban districts. The householders of these urban areas elect an urban district council, which combines the functions of the parish council and the rural district council, with greatly extended powers. A steadily increasing number of urban districts (now over 300 in number) have, sometimes because of past historical importance, sometimes because of present populousness, been given by the Crown (nowadays the Privy Council) the status of chartered municipal corporations; these elect their councils annually by thirds instead of triennially, and women are not eligible as members. Moreover their councils elect to preside over them, not a chairman but a mayor; and they coöpt into their own bodies additional members styled aldermen. Such of them as have any considerable population (127 in number), have their own police forces, under the control of their own town councils. Apart from minor technicalities there is practically no other difference between an urban district which is, and one which is not, a municipal corporation. The words "town" and "borough," it may be mentioned, are used in England, for any urban place, irrespective of size. The word "city" is of equally lax usage, but it ought to be restricted to those towns, large or small, which have been specifically termed or created cities by statute or royal enactment. Above all these bodies stands the county council; elected triennially by the occupiers of houses or lands within the county, whether residing in rural parishes, urban districts or municipal corporations. The county council is the authority for education; it provides the public lunatic asylums; it either pays for or itself maintains the main roads; it administers various minor services for the county as a whole; and it exercises a certain amount of supervision and criticism and some slight control over the minor local authorities. It contributes half the members (the justices of the peace nominating the other half) to the standing joint committee, which controls the county police force.

Most of the boroughs over 50,000 inhabitants (and some ancient towns below that population) stand outside the area of the administrative county, and are neither represented in nor controlled by the county council. These, the so-called county boroughs (now over 60 in number) are entirely autonomous municipal corporations, which have, in addition, the powers of county councils. The town council, elected in the same manner as that of other municipal corporations, and presided over by a mayor (or in six cases a lord mayor) is (apart from the administration of justice and of

the Poor Law) the sole local governing authority of the city, with practically unlimited autonomy within the scope of the statutory authority entrusted by Parliament to local authorities generally; and not even subject, as regards its expenditure on all but one or two subjects, to the general Local Government Board audit. It is an important feature of these county boroughs that they (like the other municipal corporations of any size) have their own police forces, exclusively under the control of their own town councils (by the "watch committee").

The 4,750,000 who inhabit the metropolis have a more complex local government than the citizens of Liverpool or Manchester. London is divided into 29 metropolitan boroughs, one of them being the ancient city preserving still its Corporation, its lord mayor, and other dignitaries and various other peculiarities. These metropolitan boroughs have each a council, elected triennially by the householders, which administers the paving, cleansing, and lighting of the streets, the minor house drainage, the removal of refuse, the suppression of nuisances and the collection of all the municipal taxes. The City Corporation, in addition, manages, with its own considerable estates, the central markets, some of the bridges, the special city police force and (in part) the port of London. Above these local bodies stands the London County Council, with annual receipts and expenditures exceeding £9,000,000 sterling, with 118 members elected triennially by the householders of the whole administrative county of London, together with 19 coöpted aldermen; and responsible for education, main drainage, parks, and recreation grounds, the lunatic asylums, the tramway service, the river steamboats, the great street improvements, the demolition of "slum" areas and the erection of new dwellings, the administration of the stringent Building Act and a host of miscellaneous county services, together with the management of the debt of London, not only for its own needs, but also for those of the other local bodies (except the City Corporation). The water supply of the whole metropolitan district, extending to much more than the county area, is in the hands of the Metropolitan Water Board, a body made up of representatives of all the local authorities concerned. The Thames is administered by the Thames Conservancy Board, a body constituted on a similar plan.

The foregoing survey of English local government omits two branches, which, from historical causes, still retain their separate organizations. Nearly the whole of the collective provision for special classes (but not that for lunatics, nor that for persons suffering from infectious diseases) is in the hands of what are called the Poor Law authorities. The country is for this purpose divided into 656 unions of parishes, often not corresponding with the boundaries of urban districts, municipal corporations, county boroughs or counties. The householders of each of these unions elect either annually or triennially, a board of guardians, which administers the public provision for the aged and infirm, the orphan and deserted children, the indigent sick, the tramps or vagrants, and the destitute of every kind. These boards of guardians levy, for the cost of their schools, infirmaries, work-

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houses and "outdoor relief," an unlimited tax on householders, the celebrated poor rate. They have complete discretion as to the amount of money that they will spend, and as to the amount of the relief that they will afford (above the legal "national minimum" of preventing death by starvation); but their discretion as to the mode of relief, as to the erection of buildings, as to the appointment of officers, and as to the raising of loans is guided, and, in the last resort, controlled, by the Local Government Board, which has (in this branch of local government more than in any other) the power of issuing peremptory orders having the force of law. In London, where there are 31 boards of guardians, these have also a joint body, the Metropolitan Asylums Board, made up chiefly of their nominees, which manages the infectious disease hospitals and the asylums for idiots. It should be said that there is a great tendency to make, by rearrangement of the unions, the areas of these Poor Law units coincide with those of rural and urban districts the county boroughs. The persons who are elected as members of rural district councils already serve also, without other election, as Poor Law guardians. It is not unlikely that a few years will see the boards of guardians abolished and their duties transferred in county boroughs to the town council; in counties, partly to the county council and partly to the urban or rural district council, and in London, partly to the London County Council, and partly to the metropolitan borough councils.

The other important branch of local government with an organization of its own, and the only one not upon an elective basis, is that of the Justices of the Peace. These are gentlemen of position who are individually appointed by the Crown (the Lord Chancellor), by being included in what is termed the Commission of the Peace. In practice, however, they are almost always chosen by the Lord Lieutenant of the county, who, in most counties, defers informally to the wishes of the existing justices. Thus, the "County Benches" are, in effect, recruited to a great extent by an informal system of cooptation. The principal function of the justices is that of acting as magistrates. Any one justice can issue summonses to appear and warrants to the police for the apprehension of offenders; any two within each county can hold a petty criminal court ("Petty Sessions"), with power to inflict sentences of fine and short terms of imprisonment (subject to appeal to Quarter Sessions), or to commit to prison pending trial at a higher court; and once a quarter, the meeting of justices in "Quarter Sessions" forms a criminal court trying, with a jury, all but the most serious crimes, such as murder and grave felonies. At Divisional Sessions, the justices license retailers of alcoholic drink, nominally at their discretion, but really without effective powers of refusing the renewal of existing licenses, except for grave misconduct. A recent statute enables them to award compensation, charged by a special rate on the district concerned, to the holders of licenses which they withdraw merely on the ground that they are unnecessary. Finally, the Justices in Quarter Sessions, by nominating half the members of the standing joint committee (the County Council sending the other half) go far

to control the county police force. It should be said that a slight elective element is infused into the County Benches by the fact that the chairmen of the urban district councils are *ex officio* justices. The county boroughs, and also most of the smaller municipalities, have commissions of the peace separate from those of the counties, and the Justices of the Peace so appointed usually comprise the Mayor for the time being, and the leading members of the town council. They have the same judicial and licensing powers (though no control over the borough police force); but in most towns of any size they perform few judicial duties. In many towns there is also a stipendiary professional police magistrate, appointed by the Crown (Home Office) at the request and at the expense of the town council, who relieves the justices of the police court work. In towns having their own Court of Quarter Sessions, the duties of judge are performed by the Recorder, also appointed by the Crown (Lord Chancellor), who is always a barrister of position, merely visiting the town for the purpose of holding the quarterly court, and receiving for this duty a small annual stipend.

There remain to be mentioned certain local authorities standing outside the general system. At Liverpool and some other ports the port is managed by a harbor trust or board, usually elected by the payers of dock or port dues, including the shipowners, with more or less representation of other local governing bodies. The Mersey Docks and Harbor Board, as the Liverpool port authority is called, administers a series of docks representing a capital outlay of some £30,000,000 sterling. In low-lying or marsh districts there are ancient bodies called commissioners of sewers, appointed in form by the Crown (Lord Chancellor), but practically renewing themselves by cooptation. These bodies maintain the seawalls, sluices and embankments, enforcing on the neighboring land owners their obligations of tenure, and levying on them the cost of necessary common works. The most exceptional of these authorities is that of Romney Marsh, in Kent, where the owners for the time being of 23 ancient estates are, by themselves or their deputies, "Lords of the Level," with extensive taxing and judicial powers for the maintenance of the great seawall.

RELATION BETWEEN LOCAL AUTHORITIES AND THE NATIONAL EXECUTIVE.

In the matter of the relation between the national executive and the authorities administering the various services of local government, England occupies a position intermediate between that of France on the one hand, and the New England or Western States of the United States on the other. The very real autonomy of the English local governing body—greatest in the County Borough, or in such bodies as the Mersey Docks and Harbor Board or the Commissioners of Sewers of Romney Marsh, and least in the Boards of Guardians—marks it off from any analogous authority in continental Europe. The English local authority for each area is formed without any intervention of the national executive (except in the

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cases of the Justices of the Peace and the ordinary commissioners of sewers, and then mainly in form only), and entirely independently of its volition. It is, for the most part, not subject to the orders of any part of the national executive; it has, in nearly every case, real and complete discretion as to the manner in which its services shall be rendered or the law of the land carried out; it can, for the most part, determine whether or not a particular service shall be supplied in its locality; in all cases it decides on its own responsibility upon its own budget of expenditure, and (whilst not able to impose a new kind of tax) as to the rate of the taxation—of the kind prescribed by statute—which it will levy upon its constituency; and whilst in particular instances it is required to obtain the approval of the national executive, either for its projects or to its actual administration, its practical independence is such that a stubborn local authority usually gets very nearly its own way. To an Englishman, as to an American, it is almost inconceivable that a local authority should be appointed, wholly or in part, by the national executive (unless merely in form); that it should receive and obey orders from the Minister of the Interior; or that it should have to submit its budget for the approval of any superior. On the other hand, no local authority in England—whatever the case may have been in times past—has any original, inherent, or independent powers. With the possible exception of the ancient corporation of the City of London, all the English local authorities of to-day plainly owe their origin to and derive their governmental powers exclusively from the statutes which Parliament has enacted concerning them; and they are, without exception, in all cases, subject to the conditions and limitations of those and any new statutes. A local governing body has, in England and Wales, no rights, powers, privileges or duties inherent in it merely because it is representative of the people of the particular locality; or secured to it by a constitution or other authority independent of the national legislature for the time being. Nor is there in England anything corresponding to the complete separation between the state executive and the local authorities and their mutual independence of each other that characterizes so many of the United States of America. Every local authority in England is required by law at least to furnish an annual statement of its accounts to the Local Government Board; nearly all of them have to obtain the approval of that branch of the national executive before incurring expenditure to be met out of borrowed money, and before raising a loan; most of them receive annual grants from the national exchequer in aid of their expenditure on particular local services, and have therefore to comply with the conditions that may be attached to these grants by the Treasury, the Board of Education, the Home Office, the Board of Agriculture, or the Local Government Board; finally, nearly all of them have to submit—but the municipal corporations only in respect of part of their work—to an annual audit of their accounts by auditors appointed by and responsible to the Local Government Board. These auditors do not carry out, however, the wishes of the national executive; what they have to do

is to prevent disobedience to the statutes of the national legislature. They have, in fact, to act in a judicial rather than in an executive capacity, having no power to override a mere exercise of the discretion of the local authority, but they are authorized, and indeed required, whatever the Local Government Board, or other executive authority might desire, subject to appeal to the ordinary courts of law, peremptorily to disallow and to cause to be refunded, any expenditure that (whether in respect of its subject matter, or by reason of fraud, embezzlement or mere waste) falls outside the statutory powers conferred upon the local authority. It should, moreover, be added that any difference of opinion between the Local Government Board (or other branch of the national executive) and a local authority, or between two local authorities, as to their respective legal powers and obligations, has to be determined (unless by mutual consent) not by the decision of any executive officer or by the national executive itself—not even by any special tribunal which the national executive might influence—but, as in the United States, by the ordinary Courts of Justice, applying to the dispute the ordinary law of the land, exactly as if it were a dispute between private individuals. In the same way, when a local authority disobeys or fails to comply with any of the statutes, or acts in excess of its powers, it can be coerced to obedience (apart from such disallowance of unlawful expenditure by the auditor, or such withdrawal of financial assistance from the national exchequer as has been already mentioned) only by means of actions in the ordinary Courts of Justice, which have to be initiated either by aggrieved individuals or by the national executive under the ordinary law.

But any description of the relation between the national executive and the local governing bodies in England would miss the most important feature if it omitted to lay stress on the Grant in Aid. It is the system of grants in aid from the national exchequer upon which the smooth and efficient working of the whole organization to a large extent depends. The expressed purposes of these grants in aid are (a) to assist poor localities, and prevent the local rates rising to an oppressive height, by promoting a partial equalization of burden; and (b) to induce apathetic or backward local authorities to incur expenditure on local services in which the community as a whole has a strong interest. Even more important to the student of political science is the utility of these national subventions to local government, when given in their most efficient form, in securing national efficiency, without destruction of genuine local autonomy. The basis of English local government is the statutory enactment, by the national legislature, of a minimum standard in each public service (notably in sanitation, education and police), the attainment of which is legally obligatory on every local authority, and is legally enforceable by mandamus. Beyond that national minimum in each public service, each local authority has complete discretion. It can, at the expense of its ever-rising local rates, and subject to the control implied in periodical popular election, do as much or as little as it chooses. But if it chooses to comply with certain specified conditions imposed by the

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national executive—conditions designed to secure a constantly rising standard of efficiency in particular services—it can (especially in education) obtain national grants in aid of its local expenditure, so calculated as to share the financial burden of increased efficiency between the national exchequer and the local rates. The position of authoritative criticism and ultimate power to withhold the grant, which this relation gives to the national executive—while leaving the local authority both freedom of decision and a genuine choice among methods, as well as complete autonomy in the appointment of officers—appears, on the whole, the best possible device for combining administrative efficiency with local popular control.

Bibliography.—Besides the authorities cited in the text the student should consult 'English Local Government,' by Dr. Joseph Redlich and F. W. Hirst; or 'The Parish and the County,' by Sidney and Beatrice Webb, 1906, forming the first of several volumes of an analytic and historical account of 'English local government from the revolution to the municipal corporations' act.' Brief descriptions of the actual organization of to-day are 'Local Government,' by Percy Ashley (1905); and 'Local Government,' by Dr. Blake Odgers (1902).

SIDNEY AND BEATRICE WEBB,
Joint authors of 'Industrial Democracy,' etc.

13. Great Britain—Civil Service. The present organization of the English Civil Service may be said to have originated in the appointment by Order in Council in 1855 of a Civil Service Commission sufficiently strong and independent to check in some degree the then existing abuses of Parliamentary patronage.

In the earlier years of the reign of George III. the King had kept patronage in his own hands, and had used it with the single view of increasing his personal power. Edmund Burke's reform of the Civil List (1782) brought in a new and more permanent organization of the government offices, which made royal pressure on the "placemen" more difficult. In 1809 a Superannuation Act had the practical effect of giving civil servants the right to hold their office during good behavior. From 1810 they were paid by salary instead of by fees, and from 1816 the salaries of many posts were provided by a Parliamentary grant. By this time the royal power was exercised by the cabinet ministers, and they, through the "Patronage Secretary to the Treasury," who acted (and still acts) as Parliamentary "whip," avowedly used their patronage on the nomination of individual members of Parliament as a means of keeping together a majority in the House of Commons. Lord John Russell, in his 'History of English Government and Constitution' 1823 (page 402), speaks of Parliamentary patronage as being "of late years more completely organized."

The legislation which followed the Reform Bill of 1832 increased the number and importance of civil service posts, while the growth of the railway system and of other forms of joint stock enterprise made it more difficult for the government to retain its few really able officials. The majority of the persons appointed on the nomination of ministers and members of Parliament were notoriously incompetent. Each party

respected the appointments of its predecessor and no one lost his post on a change of government—a fact which, while it mitigated the evils of the spoils system, added to the permanent inefficiency of the service. Occasionally a strong man (like Sir James Stephen, 1789-1859, or Herman Merivale, 1806-1874), was appointed from outside in middle age for special work, but as a rule men were appointed young and were employed for their first 10 or 15 years in copying letters and other routine occupations. The effect on the personnel of the offices is described by Sir Charles Trevelyan and Sir Stafford Northcote (Report on the Civil Service, 1854): "Admission into the civil service is indeed eagerly sought after, but it is for the unambitious and the indolent or incapable that it is chiefly desired. Those whose abilities do not warrant an expectation that they will succeed in the open professions, where they must encounter the competition of their contemporaries, and those whom indolence of temperament or physical infirmities unfit for active exertion, are placed in the civil service."

The effect on the constituencies was even worse. Sir Charles Trevelyan, writing many years later, says: "Every borough and county except a few of the largest had its local manager on either side—a banker, brewer, or solicitor—who purchased the vote and support of the leading men by a judicious application of the loaves and fishes. The corruption so engendered was more constant and general than the bribery carried on by means of money, and it was also more influential, in the degree in which a provision for life for a son or some other person in whom a voter was interested was more valuable than the customary five-pound note." (Eaton, 'Civil Service in Great Britain,' p. 431).

In 1853 the government appointed Sir Charles Trevelyan, with Sir Stafford Northcote as his colleague, to inquire into the whole question. Trevelyan had been (1826-1838) in the service of the East India Company and was the brother-in-law of Macaulay, who had been (1832-1834) secretary to the India Board of Control and (1834-1838) legal member of the Governor-General's Council. In 1833 Macaulay had suggested open competition for the "writerships" of the East India Company as the only effective method of controlling the patronage of the directors.

The Government of India Bill of 1853 carried this proposal into effect, the first open examination being held by the India Board in 1855.

Trevelyan and Northcote's report was presented in January 1854, and proposed open competition for the English civil service, and the separation of the service into higher and lower divisions. Gladstone, as Chancellor of the Exchequer in Lord Aberdeen's government, agreed with the scheme, and civil service reform was promised in the Queen's speech of 1854. Meanwhile the report had been sent round to a number of distinguished educators and administrators whose opinions, mostly pessimistic, were published by the government (Reports and Papers, 1854-55). In March 1854 the Crimean War began, which prevented any large reform being undertaken and the scheme was denounced in the House of Lords, by Lord Malmesbury

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and others, 13 March 1854, as inconsistent with aristocratic government.

In January 1855 Lord Palmerston, who disapproved of Trevelyan's scheme, became Prime Minister. But the administrative disasters of the war had stirred public opinion, and a strong Administrative Reform Association, under the leadership of Sir Henry Layard, had been formed. Dickens expressed the popular indignation of the time in his picture of the Tite Barnacle family in 'Little Dorrit' (1855-57), which perhaps was partly inspired by Carlyle's attack on "Downing Street" in his 'Latter Day Pamphlets' (1859). Palmerston so far gave way as to create by Order in Council (21 May 1855) a Civil Service Commission whose duty it should be to conduct an independent examination of all nominees. Resolutions in the House of Commons in favor of open competition were lost (10 July 1855) and carried 24 April 1856, and in 1857.

From the first, some of the examinations conducted by the Civil Service Commissioners were in fact competitive, owing to the nomination of more candidates than there were appointments. In 1860 a strong Select Committee inquired into the whole question and reported that their own preference was in favor of open competition, but that in order that the government should not go beyond public opinion they recommended the extension of this system of "limited competition" to the civil service generally. The evidence taken by the committee showed that some of the older civil servants still objected to the examination system, even under the conditions which had prevailed since 1855, on the ground that it had introduced "a class of men above their work." The opinions of one of the better officials who had been introduced by the old system of unchecked nomination are expressed in Anthony Trollope's novel 'The Three Clerks' (1858).

The recommendations of the Select Committee were accepted by the government, and for the next 10 years a competition between at least three nominated candidates took place for each appointment.

The introduction of household suffrage in towns by Disraeli's "Leap in the Dark" Reform Bill (1867) and the defeat of the Conservative party at the election of 1868, altered the whole political position of the civil service question. The existing aristocratic political families felt that their hold on patronage was gone, and were afraid of the results which would follow from the use of patronage by members of Parliament under the pressure of the newly enfranchised voters. The system of open competition for the Indian civil service introduced 15 years before had worked well, and Gladstone was able to publish (4 July 1870), almost without opposition, an Order in Council throwing open to competition most of the government offices. The Foreign Office and the Home Office (which controls the police) were excepted, owing to a belief that secrecy was better secured by a system of nomination. A few years later (1873) the Home Office was thrown open.

When the post-office took over the telegraphs from the railway companies in 1870 it was found that a few women officials were at work. These were retained, and since then the number of women civil servants has been increased. There

were 7,000 of them recorded in the census of 1881, 15,000 in 1891, and 16,000 in 1901. A few women have been appointed to important posts as inspectors.

Gladstone's Order in Council of 1870 still in essentials regulates admission to the English Civil Service, though alterations of name have occurred, such as the substitution of "Second Division" for "Lower Division" in 1890, and changes of salary, status, and examination subjects.

The system has been worked with a certain amount of elasticity. Men of all ages are from time to time appointed without competition to posts involving special knowledge, and competitive examination is never used in such cases as a test of qualifications. In some cases, as in the starting by the Liberal government of 1892-95 of the Labor Department of the Board of Trade and the Inquiries Department of the Board of Education, appointments have been given without examination to men from outside, although the work to be done is similar to that done elsewhere by civil servants recruited in the ordinary way. Inspectors are practically never appointed by examination, and the "Examiners" of the Board of Education, whose work is practically that of the "first division clerks" in other offices, are appointed by the president of the Board, generally from men who have just distinguished themselves at Oxford or Cambridge. Artisans at the royal dockyards and on other government work are appointed without competitive examination from lists of waiting applicants, and the same method is used for recruiting the police of London (which is under the central government). The younger "second division clerks" are allowed to compete on equal (or slightly more favorable) terms with the outside candidates for first division clerkships, but in no case is competitive examination used as the method of selection for promotion within the service.

Speaking generally it may be said that the English government believes that competitive examination in the ordinary subjects of study is an excellent way of selecting young men for employment at the end of their school or university career, whether at 17 or at 22 years of age, but that it is not effective when applied to men engaged in professional work or as a test of professional knowledge. The fact however that the main body of the officials are appointed by competition has produced an *esprit du corps* which keeps the whole service out of politics, and the exceptional cases of appointment by nomination neither excite nor as a rule deserve criticism.

Any serious modification in the present arrangements which may be introduced in the future will probably be due to the changes which are going on in the English educational system. In 1855 and in 1870 almost all young Englishmen of the well-to-do classes who did not enter the army or navy went through the same course of education in classics and mathematics at the old endowed "public schools" and the two great universities. Professional preparation for the young "gentlemen" followed graduation, and therefore it was very easy immediately after graduation to compare their abilities and acquirements by examination. Those who failed began, without feeling that they had wasted

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either time or effort, preparation for the Bar or the Church or the "public school" teaching profession, or more often started their professional work with little or no preparation. In the same way an examination for the lower civil service confined to reading, writing, and arithmetic, corresponded to the facts of the time, for few boys who did not go through the public school course learnt much else. Since 1870 the number of "secondary" and "higher grade" schools with a fairly wide curriculum has enormously increased. In 1898 it was found that the old narrow examination for the lower division had become by the mere force of competition a difficult and technical test for which boys left their schools and prepared themselves at crammers. A wider curriculum including modern languages and science was therefore substituted. This fact and the facilities in London and other cities for obtaining higher education in evening classes is tending to lessen the educational advantages possessed by the average first division clerk over a clever and ambitious second division clerk, and to break down the original reason for their life-long difference of status.

A still greater difficulty is being created by the changes which are going on in English higher education. The English university course, both in the older universities, and still more in the new universities which are springing up in the great towns, is becoming increasingly specialized. Students come to the university for professional courses such as medicine or engineering, or law, or if they devote themselves to humanistic studies specialize on history, or philosophy, or philology. A course which is likely to lead to success in the first division examination (with which the Indian civil service examination was combined in 1897) must consist of several different non-technical subjects pursued with almost equal diligence. Such a course may tend, for those young men who have to work for their livelihood, to lead to no profession except the civil service and perhaps teaching. If so, the original advantage of that generalized examination which was introduced under Macaulay's influence into both the home and the Indian higher civil service will come to an end. It will be no longer possible for the clever youths from the universities to compete each year for civil service posts before finally deciding on their career. The generalized course will itself have become a special preparation, and it will be difficult to resist the argument that a specialized examination involving, as it does for instance in Germany, a technical course of study in law and economics would produce better results.

The term "civil service" is in England only used of the service of the central state. That fact has helped to disguise the unity of the problem of administrative employment under the central and the local government. The census figures class them together and show that the local employees are growing in number as fast as the central.

	National.	Local.
1871.....	53,000	51,000
1881.....	50,000	53,000
1891.....	79,000	64,000
1901.....	92,000	71,000

Only a few of the larger local governing bodies have a system of competitive examination

for their administrative service and "influence" is undoubtedly very powerful in securing appointments under the rest. At the same time, as the size of local governing areas and the importance of local work increases, the need of abler and better trained officials is making itself felt. It is certainly not desirable that each local service should be a "water-tight compartment," admission to which must be sought by a separate examination and within which alone promotion can be hoped for. Nor is it probable either that the central state will lay down (as it does in the case of Medical Officers of Health) certain qualifications which must be possessed by all persons appointed to local administrative posts, or that the local bodies will combine for a general competitive examination from the successful candidates at which all local bodies may draw. But if a course of preparation including perhaps law, statistics, and "Staatswissenschaft" became accepted by public opinion as the best preparation for a professional administrator, it is probable that the central and local officials would be appointed to a large extent from the same body of candidates. At present, however, opinion in England might be suspicious of a "bureaucracy" trained, as in Germany, on a common body of knowledge and in a common form of thought.

Burke in his reform of 1782 not only helped to create the class of professional "civil servants" but attempted to distribute some of their work upon a more logical and economical basis. What we now call "Government Departments" consisted then of the clerical staff attached, either to certain ancient offices of State, such as those of the Lord Chancellor, the Chancellor of the Exchequer, the Postmaster General, and the Secretaries of State, or to Committees of the Privy Council, or to Boards of Commissioners administering other ancient offices such as those of the Lord High Treasurer, or the Lord High Admiral. Each office had "grown" of itself, and new offices had been created as work increased and without reference to any consistent plan. Of the two principal Secretaries of State, for instance, the Secretary of the North conducted all correspondence with the Northern powers of Europe, and the Secretary for the South not only corresponded with France, Spain, etc., but carried on Irish business and the whole police and other work of the "Home" Department. Burke re-divided their duties, making the Northern Department the office of the Foreign Secretary, and the Southern Department that of the Home Secretary. At the same time, England having lost the greater part of her Empire, he suppressed the Colonial Secretary, who had existed since 1768, and who had by hopelessly unworkable arrangement shared his duties with a Committee of the Privy Council called the Board of Trade and Plantations. The work of both was given to the Home Secretary.

But it was not until the period of legislative activity which followed the Reform Bill of 1832 that anything like a complete survey was made of the functions of government, or that any serious attempt was undertaken to create a department for each function. Both

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the recognition of the need of such a survey and the actual form taken by the redistribution of powers were largely influenced to the suggestions of Jeremy Bentham in his 'Constitutional Code' and other writings.

The Board of Works (Bentham's 'Domain Minister') was created in 1832; the Poor Law Commission (Bentham's 'Indigence Relief Minister') was created in 1834, became the Poor Law Board in 1847, and was merged in the Local Government Board in 1871; the Committee of Council for Education (Bentham's 'Education Minister') was created in 1839 and became the Board of Education in 1899; and the Registrar General (to superintend Bentham's 'Local Registrars' of vital statistics) was created in 1837. Separate Secretaries of State were appointed for War and Colonies in 1854, and for India in 1858. A Secretary for Scotland was created in 1885, and a Board of Agriculture in 1889.

At present under a bewildering variety of names (Boards, Commissioners, Secretaries, etc.) a fairly logical system is in existence. Nearly all the work of the executive government is divided among about fifteen main departments. At the head of each department is a political chief who sits in the Cabinet and who is assisted by another member of the Government, who generally sits in that House in which the Cabinet member does not sit.

In 1906 the Departmental chiefs and their Parliamentary assistants were: for Finance, the Chancellor of the Exchequer assisted by the Financial Secretary to the Treasury; for the Home Office (Police, etc.), Foreign Office, Colonial Office, War Office and India Office,

a Secretary of State with a Parliamentary Undersecretary in each case; for Scotland and Ireland, a Secretary and Chief Secretary; the President of the Local Government Board (dealing with Poor Relief, Public Health and other functions administered by local authorities), with a Parliamentary Undersecretary; the President of the Board of Education, whose assistant (in the House of Lords) is called Lord President of the Council and is (1906) in the Cabinet; the President of the Board of Trade, with a Parliamentary Undersecretary; the President of the Board of Agriculture, without one; and the Postmaster General.

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THE JUNIOR PARTNERS.

14. Great Britain—Scottish History. *From the Invasion of Agricola in 80 A. D. to the Death of Alexander III. in 1286.*—In the main lines of its development Scotland has from the beginning been subjected to the same general influences that have determined the civilization of all the countries of Western Christendom. Like each of these countries, however, it has had a history of its own which has given a specific stamp to the character of its people, to its institutions, laws, customs, and social arrangements. Among the nations of Europe Scotland has an individuality as distinctive as that of any of its more powerful neighbors, and it has made its own contribution to the general sum of knowledge and to the advancement of humanity. Let us in a rapid survey glance at the general and special conditions under which her people became a nation and acquired the characteristics by which she is known to the world.

Remote as is her geographical position, Scotland, from the moment it appears in history, was an integral part of Western Europe. Like England, France, and other countries she also came under the domination of the Roman Empire, and her history begins with the invasion of Agricola in the year 80 A.D. In her case, however (and it is

a note of difference at the very beginning of her history), the Roman dominion never passed beyond a military occupation, and, except material remains, left no permanent impression of its presence. The next powerful influence that helped to determine the future of Europe was the spread of Christianity, and for this influence Scotland had not long to wait. About the year 563 Saint Columba introduced Irish Christianity into the country north of the River Forth, and by the first quarter of the 8th century the whole of North Britain came nominally under the jurisdiction of the Bishop of Rome. Christianity was a common factor in the process which led to the formation of the nations of Western Europe, but in Scotland, as in other countries, there were specific conditions that determined the character of her development and permanently influenced the genius of her people. There was first the physical nature of the country, and, second, the fact that peoples speaking different languages divided the land between them. As far as her internal history is concerned, the dominating physical fact was the division of its surface into a Highland and a Lowland country. The River Forth "that bridles the wild Highlandman," dividing these two territorial sections by a natural line, has been,

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in fact, a determining factor in the development of the Scottish nation. To the north and the south of the Forth respectively there have existed to the present day two distinct peoples, speaking different languages and possessing different characteristics, partly the result of original racial idiosyncrasies and partly the result of their respective histories. The mutual relations between these two peoples, it will be seen, have been of the first importance in the history of the Scottish nation.

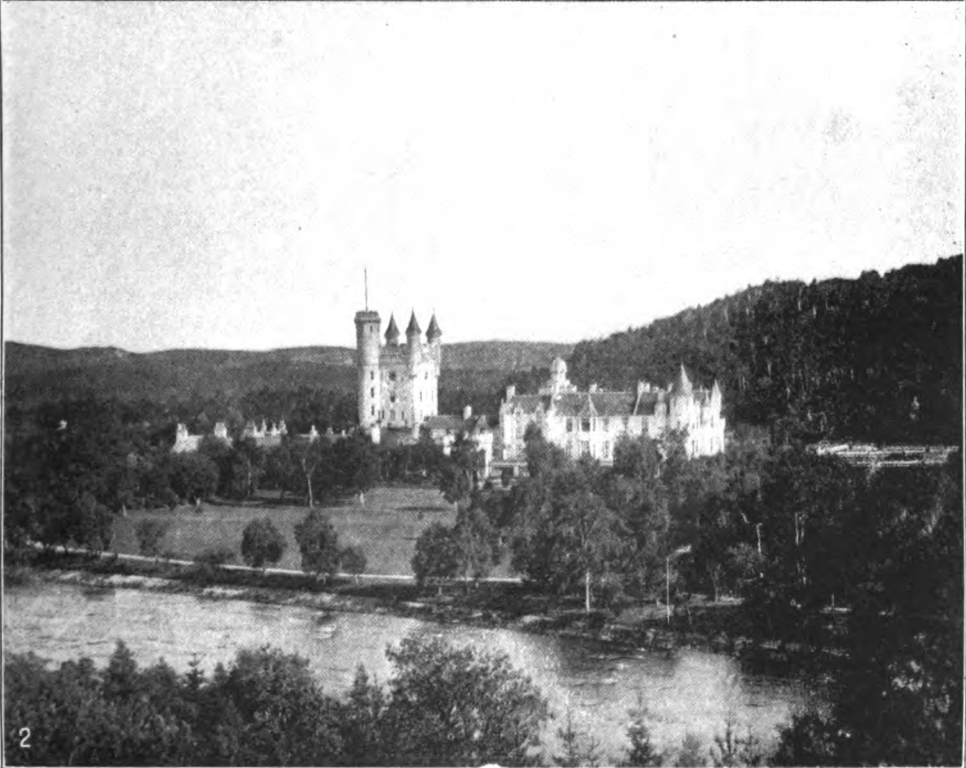
In the first quarter of the 11th century the entire mainland of Scotland was nominally consolidated under one ruler, Malcolm II., who came of the Celtic race beyond the Forth. Though territorially consolidated, however, there was little cohesion between the northern and southern sections of the Kingdom, and the process in the next stage of national development (1100-1300) was the knitting of the bonds between the different peoples and their gradual subjection to an acknowledged head. In this process, also, there were general causes at work which were common to Christendom, and causes which were peculiar to Scotland herself. The general causes were the introduction of the feudal system, the organization of the Church with Rome as its centre, and the growth of towns and municipal institutions—all the result of the general movement among the countries of Western Europe. Peculiar to Scotland itself during this period of her development was the decisive supremacy obtained by the Teutonic over the Celtic peoples in the direction of the national destinies. The marriage (1079-1093) of Malcolm Canmore, a Celtic prince, with the Saxon Margaret marks the beginning of the struggle between the two races which was to decide whether there was to be the Scotland which exists to-day. From that marriage issued a line of kings with Teutonic names, Teutonic sympathies, and with the abiding purpose of Teutonizing the national institutions. The reasons for this policy are sufficiently obvious. The country between the Firth of Forth and the Tweed, which had been acquired through conquest by the Celtic kings of the north, and whose inhabitants were mainly Teutonic, was the most valuable part of their kingdom, and naturally tended to become its political centre. From the death of Malcolm Canmore in 1093 to the death of Alexander III. in 1286, therefore, the task of the successive Scottish kings was, on the one hand, to defend the southern part of their dominions against the encroachments of England, and, on the other, to hold in check their Celtic subjects to the north of the Forth and in the extensive district of Galloway (also mainly Celtic) in the southwest. By the death of Alexander the task had been accomplished, and Scotland was now a consolidated kingdom, effectually ruled by one acknowledged prince, with Teutonic influences in the ascendant.

The Struggle for Independence.—The death of Alexander III.'s only heir, Margaret of Norway, led to the attempt of Edward I. of England and his immediate successors to

attach Scotland to the English Crown, and for more than half a century she had to fight for her bare existence as a nation. The results of the struggle were of the highest importance for the future of her people. Successfully maintaining her independence, by the very effort she made for self-preservation she became a united nation with a consciousness of a distinct destiny which had not been present to her even in the "golden days" of Alexander III. By the ordeal they had passed through, moreover, the Teutonic section of her people, who had been mainly interested in the issue of the struggle, acquired that national characteristic "the carl o' hemp in man"—that dogged persistence, which the world has recognized as a peculiarity of the typical Lowland Scot. But, as we shall see, there was another result of the struggle for independence which, if it did not affect the national character, powerfully influenced Scotland's laws and institutions, political, social, and municipal. In the contest with England she had sought the alliance of France, and for two centuries and a half she was in closer contact with France than with England. Previous to the War of Independence it was from England she had borrowed what she needed; now it was to France that she looked as her model.

The Development of National Institutions Under French Influence, 1472-1542.—From the death of David II. in 1472 to the beginning of the reign of Mary in 1542 is a well-marked period of Scottish history, during which the national institutions assumed the general form which they maintained till the union of the Scottish and English Parliaments in 1707. Throughout this entire period the dread of English aggression was still the constant preoccupation of the people, and this permanent dread at once deepened the national traits of hardihood and caution and contributed to the strengthening of national sentiment. In the development of institutions we have again to note the action of causes common to western Europe. Like the kings of other countries the Kings of Scots deliberately aimed at crushing the power of the feudal nobles and establishing a central authority over which they should be supreme. But in this endeavor they were checked by two hostile forces—the power of the Scottish nobles themselves and the insubordination of their Celtic subjects in the Highlands and the Western Islands. As the result of these opposing forces, whose relative strength was constantly changing, a Parliament like that of England, with well-defined privileges and efficaciously representing the different classes of the people, could not come to birth in Scotland. In the Scottish Parliament or Estates (so-called in imitation of the French *Etats*), the Lords Temporal and Spiritual, the Commissioners for the Shires and Burghs, sat in one House and nominally legislated for the nation, but the actual power of the Parliament was in the hands of a committee known as "The Lords of the Articles," the choice of which lay with the king or the greater barons according as the one or the other was

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1. Melrose Abbey, Scotland.

2. Balmoral Castle, Scotland.

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in the ascendant. Till the Scottish Parliament ceased to exist, therefore, it was but the convenient instrument of whatever authority chanced to preponderate in the State. In the case of other institutions it was from France that Scotland borrowed the models she sought to imitate. It was from France, mainly during the period of which we are speaking, that she took over the Roman law, thus departing from the example of England; and the College of Justice (the present Court of Session), established by James V. in 1532, was formed on the pattern of the *Parlement* of Paris. In the election of municipal bodies in the burghs the method of France was likewise adopted (the retiring body electing its successor), a method which prevailed till as late as the 18th century. From France, also, during the same period was taken the arrangement of feu-farm by which land was leased in perpetuity—an arrangement encouraged by the Estates and intended (ineffectually as it proved) to remedy the system of short and precarious leases which till the 19th century disastrously affected agriculture in Scotland. When to these borrowings we add the fact that the majority of highly educated Scots studied in the schools of France, it will be seen that, apart from the political results of the alliance, the influence of France in Scotland is one of the important facts in the national development.

From the Reformation to the Revolution, 1542-1689. Adoption of Protestantism and Alienation from France.—With the beginning of the reign of Mary (1542) Scotland makes a new departure and enters on a period which definitely closes with the Revolution of 1689. The dominating fact of the period was the adoption of Protestantism in place of Catholicism as the national religion (1560). The immediate result of the change of religion was alienation from France as a Catholic country and approach to England, with an ever-growing conviction on the part of both peoples that political union was in the interests of both. But there were other results from the religious revolution which permanently affected the national character and the future of the country. For the first time in the nation's history an issue was presented which the public mind was mature enough to comprehend and which was of a nature to evoke the inherent contrarieties of thought and feeling which divide man from man. From the change of religion and the political consequences it involved there resulted a collision between two types of mind which have been in antagonism ever since. But this very collision of opposites produced a quickening of the general consciousness which made Scotland a nation in the strictest sense of the word. From the Reformation to the Revolution the country was cleft in twain by two opposing principles and two opposing parties, between which compromise was impossible and political equilibrium was unattainable. On the one side were the successive Stewart kings who aimed at absolute control in Church and State, and on the other, the religious party which adopted

Presbyterianism as its form of church polity and which maintained the Church's independence of the State. After a struggle that had lasted above a century came the Revolution of 1689, when England and Scotland both cast out the House of Stewart and a new order began.

From the Revolution in 1689 up to the Present Time; The Union of Scottish and English Parliaments (1707); The Jacobite Risings; Subsequent Privileges; Modern Development.—For Scotland as for England the Revolution marks the beginning of the modern time. Throughout the foregoing period theological considerations had dominated the public mind equally in affairs of Church and State; henceforward secular interests become more and more the impelling motives that determine the action at once of the State and of the individual. The immediate result of this changed attitude was the union of the English and Scottish Parliaments in 1707. In the previous century ecclesiastical differences had been a bar to this union; now considerations of reciprocal interests determined both nations to accept it. For Scotland the union was a necessity if she was to take her place among the nations. Hitherto she had labored under disadvantages which, in spite of the strenuous efforts of her people, had impeded her free development. Her remote situation, her limited area of arable soil, her long antagonism to England, her political and religious distractions, and, as the result of all these concurrent disadvantages, the meagreness of capital, had crippled her in all her efforts to develop her resources and to compete with more fortunate nations. The immediate consequences of the union, however, did not give promise of the future that was in store for her. The old jealousies between the two partners increased rather than abated, and for fully half a century Scotland sullenly acquiesced in a union into which (such was the feeling generally expressed) she had been entrapped by unscrupulous statesmen, and from which she had only received insult and injury. The Jacobite risings of 1715 and 1745 are the significant commentary on the state of feeling even in the Lowlands, but, as the issue of both enterprises proved, the heart of the nation was too deeply committed to the new order to revert to a régime that would have been inherently opposed to the spirit of the new time.

By the middle of the 18th century the advantages that accrued from the union were no longer doubtful, and henceforward the industrial and commercial progress of the country exceeded the expectations of its most sanguine advocates. Manufactures multiplied; the mineral wealth of the country and the riches of its seas were utilized for the first time on an extensive scale. Foreign trade had hitherto been almost entirely restricted to the exchange of commodities with the countries bordering on the German Ocean and the Baltic Sea, but by the opening up of trade with America, Glasgow, Greenock, and Paisley—mere villages at the time of the union—grew into great

towns and important commercial centres. Hitherto, also, of the three types of burghs peculiar to Scotland—Burghs of Barony, Burghs of Regality, and Royal Burghs—only the last had enjoyed the privilege of foreign trade in staple commodities, but this privilege gradually fell into abeyance, and every burgh with sufficient enterprise was at liberty to compete with its neighbors. In connection with the burghs a further progress has to be noted. In Scotland, as in other countries during the Middle Ages, trade and commerce had been shackled by conditions, necessary at the time but which were incompatible with free national development. Only Royal Burghs had possessed the privilege of being the homes of the great industrial crafts; in all the three types of burghs only burgesses had the right of pursuing any form of trade; jealous rivalry prevented free commercial intercourse between the different towns of the kingdom; and, finally, the fixing of the prices of commodities by the town councils or by the state obstructed the natural competition which is the life of trade. Later than in England, though not later than in France and Germany, these restrictions gradually ceased to be operative, and in 1846 "exclusive privileges" in trade and commerce were formally abolished by Act of Parliament.

Thus by the awakened spirit of her people and the surprising development of her resources, Scotland, for long a thorn in the side of her more powerful neighbor, came to be England's valuable ally in the building up of empire. To the growth of the British colonies it is admitted that she has contributed even more than her relative share: the number of pioneers whom she has sent to New Zealand, to Australia, and Canada is relatively greater than has proceeded from England, and equally out of proportion is the number of rulers and soldiers she has given to India and the other dependencies. In science, philosophy and literature it is sufficient to recall the names of Watt, Adam Smith, Hume, Burns, Scott, and Carlyle, to prove that she has contributed her own quota to the common stock of material and spiritual wellbeing.

In the rapid development of the country the Lowlands of the south and east were the principal agents, but the Highlands also were powerfully affected by the transformation of the rest of the kingdom. The risings of 1715 and 1745 may be regarded as the last efforts of the Celtic population of Scotland against the Teutonic element, to which it had been in permanent antagonism since the time of Malcolm Canmore. Through the action of the government after the last attempts of the Stewarts to recover their heritage the Highlands ceased to be a source of danger, but became a source of economic perplexity. The social conditions under which the Highlanders had hitherto lived now came to an end: the time-honored raids into the Lowlands were no longer possible, and the Highland chieftain ceased to be a feudal lord and became a proprietor

interested in the produce of his land. Thus arose the problem, even yet imperfectly solved, how under their conditions of climate and surface and soil the Highlands might be made a tolerable abode for their populations and a partaker in the general prosperity of the country. But, though in the past debarred by physical conditions from playing a main part in the material development of the country as a whole, the Highlander is yet a constituent element of the Scottish nation. The nature of his home, the romance that has come to surround his character and his history are valuable assets among the national possessions. The natural complements the one of the other, the Lowland Scot supplies the cautious persistency, the sure hold of the fact indispensable in the conditions of modern life, while his Highland fellow-countryman by his quicker emotions and his natural grace is a standing reminder that there are other ideals than those of mere material prosperity.

Religion and Education.—We have seen that during the 16th and 17th centuries public affairs in Scotland were dominated by ecclesiastical considerations, and that at the Revolution of 1689 this domination came to an end, and material interests came more and more to occupy the public mind. Nevertheless, though religion thus ceased to be the determining factor in the national policy, it still remained a subject of absorbing public interest to the community at large, and throughout the 18th and 19th centuries religious controversy fills a large place in the national history. As a result of the Revolution, Episcopalianism, which had been made the national church by Charles II. at his Restoration in 1660, and which clung to the House of Stewart as its founder and patron, was disestablished in 1689, and Presbyterianism put in its place (1690), was bound by its own interests to support the Revolution régime. The National Church thus established remains till the present day, but in the course of the last two centuries there have been frequent secessions, resulting in the formation of various religious bodies of more or less importance. By the restoration of lay patronage in 1712 a division of opinion was created which led to the first Secession under Ebenezer Erskine, whose members are known as the "Associate Presbytery," or popularly as "Seceders." Among the Seceders themselves there soon arose a division regarding the oath of allegiance enacted from the Scottish burghs, from which sprang the two bodies, respectively denominated Burghers and Anti-burghers. In 1761 came another Secession from the Established Church, also occasioned by difficulties connected with patronage—the new Secession taking the name of the "Presbytery of Relief." In 1820 the Burghers and Anti-burghers united under the designation of the "Associate Synod of the Secession Church," and in 1847 this body joined that of the Relief, to form the "United Presbyterian Church." In 1843, one of the memorable years in Scottish Ecclesiastical history, the national church suffered its greatest disaster since the Revolution. Once more on the question of patronage, as involving the question of spiritual independence—the right of a church to inde-

pendence of the State in all matters touching purity of doctrine—a numerous body of its ministers, led by Dr. Chalmers, effected the "Disruption" and set up what was known as the "Free Church of Scotland." Finally, in 1900, the Free Church and the United Presbyterian Church united under the name of the "United Free Church of Scotland." In this union, however, a minority of the Free Church refused to concur, and a judgment of the House of Lords (1904) decided that the property of the church belonged to the minority—a decision which occasioned an Act of Parliament appointing a commission to allocate the property between the two sections. Thus at the present time in Scotland there are two main bodies of the Presbyterian Church: the Established Church and the United Free Church. The Scottish Episcopal Church and the Roman Catholic Church, the latter mainly consisting of persons of Irish extraction, are the two other chief religious denominations. In the recent history of Scottish elementary education the most memorable event is the Education Act of 1872, by which Board Schools were substituted for the old Parish Schools and education was made compulsory from the age of five to thirteen. Seventeen years later elementary education was made free. While Scotland has always compared favorably with other countries in its provision for elementary education, her provision for secondary education remains defective, and she is now impatiently awaiting an Act which will remedy the disadvantage. Within the last half century the universities of Scotland have undergone reforms which have changed their original character and were intended to adapt them to modern needs. By the University (Scotland) Act of 1858 they received a common constitution, and by the Universities Act of 1889 this common constitution was further reformed. The supreme body in each case is a University Court; there is also a Senatus, consisting of principal and professors, who regulate internal administration. There are four universities—Edinburgh, Glasgow, Aberdeen, and St. Andrew's, to which last the University College of Dundee is affiliated.

Law and Justice.—The law of Scotland was originally based on Roman law, but there has been a gradual assimilation between the law of Scotland and that of England. This has been specially the case with mercantile law, which is now mainly identical in both countries. The system of real property law, however, is fundamentally different from that of England. In England the fee simple can be split up into estates for life, while fee simple in Scotland cannot be split up; and what is called a life-rent is merely a burden on the fee. Estates in remainder are unknown; the fee is destined to institutes and substitutes, and the word entail means in Scotland only a destination that cannot be broken except under defined conditions. In Scotland, in the law of contracts no consideration is necessary to make a contract actionable. In Scotland, law and equity have never been separated, but have always formed a single system. The law of personal and domestic relations, being largely founded on Roman law, differs in its broad principles from that of England. The tendency, however, has been to as-

similate the two in the course of modern legislative changes. Marriage, for example, need not in Scotland be celebrated *in facie ecclesiae*, but can be constituted by mere informal contract of the parties. Marriage can also be more readily dissolved—desertion being sufficient ground of itself. The administration of the civil law is vested in the Court of Sessions subject to appeal to the House of Lords. This tribunal consists of an Inner or Appellate House, which sits in two Divisions, one of which is presided over by the Lord President and the other by the Lord Justice Clerk. There is also an Outer House, consisting of five Judges of First Instance who sit singly under the title of Lords Ordinary. There are also in each county local Courts with restricted jurisdiction, presided over by sheriffs or sheriff-substitutes, which in many respects correspond to the County Courts in England, but have a somewhat wider jurisdiction. The criminal law is administered by the same body of judges sitting on the criminal side and with a somewhat different organization. In his capacity as Head of the High Court of Judiciary, the Lord President is Lord Justice-General of Scotland. There are also Magistrates' Courts, burgh and county, which exercise police jurisdiction. These magistrates are for the most part unpaid laymen.

For geography, geology, hydrography, population, education, political constitution, etc., see SCOTLAND, and SCOTLAND, LANGUAGE AND LITERATURE OF. See also the articles under GREAT BRITAIN—GEOGRAPHICAL ENVIRONMENT; THE CONQUESTS; THE REFORMATION; CIVIL WAR; PARLIAMENT; CROWN AND CABINET; RELIGION; EDUCATION; etc. For agriculture, mining, manufactures, trade, etc., see GREAT BRITAIN—AGRICULTURE; MINING; FISHERIES; INDUSTRIES; COMMERCE; BANKING AND CURRENCY; RAILWAYS; SHIPPING; etc.

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15. Great Britain—Irish History. Ireland, lying to the west of Great Britain, forms one kingdom with it, which is known as the United Kingdom of Great Britain and Ireland. This designation was introduced in the year 1800, when the Act of Union which united the Parliament of Ireland with that of Great Britain was passed. So far as political institutions can avail, Ireland is one with the neighboring country. But in spite of the political tie she stands widely divided from Great Britain by most of the characteristics which are distinctive of a nation—historical traditions, racial spirit, social and economic conditions. The distinction is marked even in the physical character of the island. Possessing little mineral wealth—iron ores in Antrim and Leitrim and some coal deposits in Antrim, Leitrim and Kilkenny—Ireland has not within itself the resources of a manufacturing country. The great central plain, stretching across the island from sea to sea, richly covered with vegetation, is adapted to pastoral and agricultural industries only, while the hilly regions to the north and south offer a soil that only tillage can make fruitful. Though water is abundant, water-power is deficient, owing to the generally low level of the country, fully one-half of which does not rise to an elevation of 300 feet above the sea.

Ancient Legends.—From the earliest times to which tradition reaches back Ireland was occupied by off-shoots of that great Celtic race which spread from the Hellespont to the English Channel. Lying within easy reach of the coast of Gaul it was exposed to the incursions of the sea-faring Celts of northern Europe. According to the ancient legends it was successively overrun and conquered by five different invading tribes. The last of these were the Milesians. The legends represent these invaders as migrating from Spain about 700 B.C. and establishing their sovereignty over the whole of Ireland. Modern scholars incline to the view that the story of the Milesian invasion is the record in tradition of an invasion by British Celts which took place most probably about the beginning of the Christian era. The political organization of the Irish Celts was strictly tribal. The land of the country was parcelled out among a number of petty chiefs or heads of tribes, who owed certain duties of tribute and service to the more powerful over-kings; above these again was the Ard-riagh or chief king whose authority was acknowledged in proportion to his power to make it effective. The tribal organization remained an enduring source of national weakness; it hindered the growth of an effective national power; it pre-

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FINGAL'S CAVE, SCOTLAND.

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vented any effective combination of the national forces against foreign invasion.

Christianity Established.—In the second half of the fifth century Ireland was converted to Christianity; its conversion was the work of a few years. That the new faith was accepted readily may be due to the fact that the previous religion of the people—if it can be called a religion—was ill-defined and unsystematized; a definite belief with a definite system of worship would not have been surrendered without a struggle. Saint Patrick, and the other founders of the Irish Church, accommodated themselves to the political organization of the country. Monastic institutions, established on lands granted by the converted chieftains, became the centres of church government, their jurisdiction being coterminous with the territory on which they were founded. They seem to have been regarded as identified with the local civil organization and were freely plundered and destroyed in the raids which, in the absence of a controlling central power, the petty rulers made on one another. This notwithstanding, monasticism exhibited remarkable developments in Ireland. For three centuries after the death of Saint Patrick the Irish monastic schools were the centres of learning in Europe. Scholars flocked to them from Great Britain and the continent; and from these schools went forth the teachers who carried faith and knowledge among the Teutonic conquerors of the Roman Empire. This missionary activity declined with the growth of civilized institutions in the new kingdoms that had been formed out of Rome's possessions. The source of supply was moreover sadly disturbed in Ireland. (See *MONARCHISM*.) At the beginning of the 9th century the Northmen, at the same time that they began their raids on England, extended their incursions to Ireland. They succeeded in establishing a few important strongholds on the coast and carried fire and sword through a country whose warring rulers met them as enemies or received them as allies according to the needs of their struggles with native rivals. The monasteries were a special object of hate to the Vikings; when their power was at length broken, in the 11th century, Irish monasticism was found to have run its course, and the field lay open to the Latin or Benedictine monasticism which was to succeed it.

Establishment of English Power.—With the 12th century opens that long chapter of Irish history which records the relations of Ireland to England. The history of those relations is the history of Ireland to the present day. In 1169 the first body of Anglo-Norman adventurers crossed the Irish Sea, the precursors of many a subsequent expedition. They came as the allies of a native chief who had been expelled from his territory. They came to stay, and after them came, in long succession, other bodies of adventurers. It was thus the foundations of English power in Ireland were laid. It was a fitful and tedious process, carried out for four centuries without any definite plan, and at no time during that period with forces sufficient to effect a general conquest. On the other hand the native Irish, owing to their tribal organization, and to the

absence of an effective central authority among them, were never able to unite for common defense against the invaders. The growth of a national spirit and a national life there was rendered impossible. Politically there were two Irelands within the island—one, that portion of the country in which English law prevailed, and the authority of the English Lord Deputy was recognized, and which came to be called the Pale; and, outside this, another, ruled by Irish chieftains, or by Anglo-Norman lords who adopted Irish customs, and who obeyed or resisted the authority of the Crown as suited their interests. Parliamentary institutions were introduced into Ireland soon after their establishment in England. But, as they were for the English settlers only, and were set in motion chiefly to provide subsidies for the English monarch, and as representation was bestowed much as the Lord Deputy chose to distribute it, the occasional summoning of a Parliament did little to promote the evolution of a national government. With the reign of Henry VIII. came the Reformation (q.v.), and, with this, the introduction of a new element of discord into Ireland. Racial and political feuds were now intensified and embittered by religious antagonism. Throughout the desolating wars of Elizabeth's reign, the "Plantations" of James I., and the sanguinary campaign of Cromwell (q.v.) the policy of at once destroying the "Irish Enemy," and extirpating popery, was consistently pursued. The defeat of the Irish at the Boyne (1689) made the English interest in Ireland definitively safe from armed attack. The English power was now supreme, and it might have been anticipated that the country would enter on a career of economic and political development. But this was not to be for some time yet. Religious hate divided the country as effectually as animosities of race. A penal code was passed against the Catholic religion which demoralized alike those who administered it and those whom it oppressed. Mr. Lecky describes it as "ingeniously contrived to injure, to insult, and to impoverish the people of Ireland." It is evident there could be no development of political organization in a country four-fifths of whose inhabitants were by law "excluded from Parliament, from the magistracy and from the bar, could not vote at elections, could not act as constables, sheriffs or jurymen, were debarred from every means of educating their children, from acting as schoolmasters, ushers or private tutors, could not marry Protestants, or purchase "manors, tenements, hereditaments or life annuities." (LECKY.)

English Repression, Subsequent Poverty, and Passage of Land Acts.—A vigorous national spirit is the best cure for the excesses of religious intolerance, and through the 18th century there were causes at work which tended to create and develop this spirit. The English government, under pressure from English agriculturists and manufacturers, had, since the Restoration (1660), hampered by restrictive legislation every Irish industry which seemed likely to compete with England in the home or foreign market. This policy of stifling or starving industry affected Irish Protestants and Catholics alike, and roused in

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them the sense of common national interests. The ablest spokesmen of the dominant party began to demand free trade for Ireland, a free Parliament, and emancipation for the Catholics. Free trade and a free Parliament were secured, and some of the more galling disabilities of the Catholics were removed. A genuine national life began to animate the country, and its progress during the period of its Parliamentary independence was unexampled. As Lord Clare put it, "No nation on the habitable globe had advanced in cultivation, commerce and manufacture, with the same rapidity as Ireland from 1782 to 1800."

But in 1800 the Act of Union put an end to the Irish Parliament, checked the further growth of that prosperity which had been stimulated by distinctively Irish legislation, and hindered the further development of that spirit of religious tolerance which the sense of common economic needs and interests was generating. Explain it as we may, England and Ireland will not, and apparently cannot, form one economic organism, in which one stream of industrial life will circulate. The long series of repressive Acts directed against Irish industries is proof of this for the centuries that are past. For our own time, the proof is furnished still more cogently. The 19th century was, for Great Britain, a period of unexampled prosperity. Her growth in wealth, in power, in population was continuous. She secured for herself the supremacy among the manufacturing and trading nations of the world, and from that eminence she has not yet been displaced. But while Great Britain was thus rising to unexampled industrial greatness, the remaining portion of "the United Kingdom" was declining in wealth and population with a rapidity which has no modern parallel. Thirty years after the Irish Parliament had been abolished, the industries which had flourished under its care had almost disappeared. The people of Ireland were, in consequence, thrown wholly upon the land. Competition for the one available means of livelihood became excessive, holdings were divided and sub-divided, and rents rose far above the economic level. The population grew, but the means of subsistence did not increase proportionately. The peasantry subsisted mainly on the potato crop; in 1846 this crop failed and famine followed. The repeal of the Corn Laws, and the competition of foreign countries, brought down the prices of agricultural produce. High rents could no longer be paid by small tillage farmers. The only farm industry as yet safe from foreign competition was that of cattle raising—the means of rapid transport from the United States, the Argentine Republic and Australia had not yet been perfected—and to make room for large grazing farms the small cultivators were ruthlessly cleared off the land. With the famine and the clearances began a movement of emigration which has reduced the population by nearly one-half. But in time the grazing ranches of the United States and the Argentine, and the sheep farms of Australia were brought within reach of the English markets, and prices fell so far that the graziers could no longer pay the high rents. An agrarian revolution was the consequence. The

Government intervened, first to fix farm rents on the basis of current prices, and, when this was found unsatisfactory, to mediate for the sale of the land to the occupiers with the aid of State credit.

A series of Land Purchase Acts was passed, and the transfer of the land to the tenants is now proceeding on a large scale. The last Purchase Act passed in 1903 provided for an advance to the tenant purchasers of £100,000,000 sterling.

Remedial Legislation Passed by English Parliament.—It must be said that the English Government has done much during the last half century to repair the injustices of the centuries preceding. Let us reckon briefly what has been done. Passing over Catholic Emancipation (1829) and the establishment of the system of primary education known as the "National" system (1831), both of which measures belong to the first half of the century, we have to put to the account of the English Parliament and Government, the Disestablishment of the Irish Church (1869) which gave equality to all religions before the law; the system of intermediate education (1878); the Royal University (1879), defective inasmuch as it does not give university education, but merely tests it and confers degrees; Local Government (1898), which bestows on elected bodies the administration of local affairs; the series of Land Acts designed to improve the position of the occupier—the Act of 1870, which put a check on arbitrary eviction, and gave the tenant compensation for disturbance; the Act of 1881, which established a tribunal to which the tenant could appeal for the fixing of a fair rent; the Act of 1885, which made the first advance (£5,000,000) to the tenants for the purchase of their holdings; the Act of 1888, which made another advance of £5,000,000; the Act of 1891, which advanced £33,000,000 for the same purpose; the Act of 1896, which amended the preceding acts; and finally, the Wyndham Act of 1903, which facilitated the operations of purchase and increased the loan for buying out the landlords to £100,000,000.

Previous to the passing of this last great measure a Department of Agriculture and Technical Instruction was established (1868) to instruct the people in the improved modern methods of agriculture and to diffuse among them a knowledge of the industrial arts.

Under these acts the operations of purchase have been carried out on a large scale. Up to 1902, under the earlier acts, over 70,000 tenants had purchased their holdings at sums amounting in the aggregate to over £20,000,000. In January, 1906, the sales under the Wyndham Act had amounted to £7,207,548.

Prospects.—In spite of all this remedial legislation it cannot be said that the prospects of Irish industry are improving. The manufactures are confined chiefly to the northeastern corner of the island, where the shipbuilding industry of Belfast, and the linen industry in the city and surrounding country employ a large number of hands. If we except the brewing industry in Dublin we may say that the rest of the country is devoted to farming. The farming is not of the intensive kind; of the

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20,350,000 acres which form the area of Ireland close on 13,000,000 acres are devoted to permanent pasture and meadow, and thus, as has been said, "Two-thirds of the country is never touched by plough or spade." Under these conditions a large population cannot be maintained in comfort. Hence the ceaseless flow of emigration, chiefly to the United States and Canada. In 1841 the population was 8,175,124; in 1901 it was 4,458,775, and the drain still continues. Discontent is the natural consequence. The cost of the administration of justice is nearly double what it is in England, where the population is more than six times that of Ireland; and 10 times what it is in Scotland, where the population is about equal to that of Ireland. Of the 103 members sent by Ireland to the Imperial Parliament over 80 are sent there to offer persistent resistance to the English Government of Ireland. On the whole it must be admitted that under this government Ireland has not enjoyed the good fortune which the framers of the Act of Union promised her. Nor has Great Britain derived from the union the advantages which the authors of the measure anticipated. The predictions of Grattan and the other far-seeing opponents of the Act have found melancholy fulfilment, and English statesmen of the present day seem warranted by the experience of a century in reverting to the policy—now finding such favor amongst them—of trusting to self-government as the best means of securing material prosperity for Ireland and political harmony between the sister countries.

The Churches.—The principal religious denominations of Ireland are the Roman Catholic, the Episcopal Protestant (late Church of Ireland, disestablished in 1869), the Presbyterian and the Methodist. The respective numbers of these communions, according to the census of 1901, are: Catholics, 3,308,000; Episcopalians, 581,000; Presbyterians, 443,000; Methodists, 62,000. The constitution and government of the Catholic, Presbyterian and Methodist bodies are the same in Ireland as in other countries. There are in Ireland 28 Roman Catholic dioceses, with 4 archbishops and 24 bishops, 1,084 parishes, and a total of 3,157 priests. The Presbyterian Church, mainly confined to Ulster, is governed by a General Assembly, in which are represented 571 congregations with 653 ministers arranged under 33 Presbyteries. The affairs of the Methodist body are managed by a General Conference which meets annually; the number of ministers in Ireland, according to the latest returns, is 254. The constitution of the Protestant Episcopal Church presents some points of special interest. The constitution of this Church was framed under the Irish Church Act of 1869, by which the "Church of Ireland" was disestablished. The supreme authority is vested in the General Synod. The General Synod consists of two houses: the House of Bishops, which includes all members of the Protestant episcopacy, and the House of Representatives, consisting of 208 clerical and 416 lay members. These representatives are elected by the clerical and lay members of the Diocesan Synods, which, in their turn, are elected by the clergy and laity respectively of the several dioceses. The Gen-

eral Synod is the supreme authority in all matters relating to discipline and doctrine within the Church. The funds of the Church are held by a body of trustees called the Representative Body. The capital sums in the hands of this body amount, according to the most recent returns, to 8½ millions sterling.

Executive.—The supreme executive authority in Ireland is vested in the King's representative, the Lord Lieutenant, who enjoys the title of Lieutenant-general and General-governor of Ireland. He is appointed by the Crown, is a peer, and must be Protestant. Sometimes he has a seat in the Cabinet and takes an active part in the Government of the country; more frequently he is a mere figurehead, the real executive authority being held by the "Chief Secretary to the Lord Lieutenant." The Chief Secretary is usually a Cabinet Minister, and is responsible to the House of Commons for the acts of the Government. The salary of the Lord Lieutenant is £20,000; that of the Chief Secretary, £4,425.

Local Administration.—By the Local Government (Ireland) Act, 1898, administrative functions in reference to highways, public health, and relief of the poor, were assigned to local bodies elected by the rate-payers—Borough Councils for the six largest towns; County Councils for the counties; and under these, Urban Councils for the smaller towns, and Rural District Councils for the country districts.

Judiciary.—At the head of the Irish judicial system is the High Court of Justice, with a Court of Appeal. The High Court includes two divisions—the Chancery and King's Bench Division. The work of these courts is done by a Lord Chancellor and 16 Judges, all appointed by the Crown, with aggregate salaries amounting to £64,000. Cases of less importance are dealt with by the recorders of the cities, three in number, and 18 county court judges, who hold their sessions at various centres through the country. The aggregate salaries of these subordinate judges amount to £31,000. A numerous unpaid magistracy, assisted by "stipendiary" or paid magistrates, deals with minor cases.

Police.—The police force of the country is wholly under Government control. Dublin has a local police force, controlled by Government, consisting of about 1,000 men, and maintained at a cost of £163,000, of which £110,000 is contributed by the Exchequer. The rest of the country is policed by the "Royal Irish Constabulary," a semi-military force of about 10,000 men maintained by Government at a yearly cost of £1,300,000.

For topography, hydrography, geology, flora, fauna, climate, population, etc., see IRELAND, and also GREAT BRITAIN, GEOGRAPHICAL ENVIRONMENT. For agriculture, fisheries, manufactures, trade, commerce, transportation, finances, banking, etc., see IRELAND, and also GREAT BRITAIN: AGRICULTURE; MINING; LAND LAWS; FISHERIES; INDUSTRIES; CO-OPERATION; FACTORY LEGISLATION; TRADE UNIONISM; COMMERCE; FREE TRADE MOVEMENT; BANKING AND CURRENCY; RAILWAYS; SHIPPING, etc. For government, education, religion, etc., see IRELAND, and also GREAT BRITAIN: PARLIAMENT; CROWN AND CABINET; POLITICAL PARTIES;

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CIVIL SERVICE; JUDICIAL SYSTEM; LOCAL GOVERNMENT; CHURCH OF ENGLAND; NONCONFORMITY; ROMAN CATHOLICS; JUDAISM; EDUCATION; etc. For language and literature, art and architecture, and further details of history, see IRELAND; CELTIC LANGUAGES; GREAT BRITAIN: THE CONQUESTS; MEDÆVAL ENGLAND; THE REFORMATION; ENGLISH HISTORY OF THE 17TH CENTURY; NAVIGATION ACTS; THE 18TH CENTURY; THE 19TH CENTURY; etc. See also IRISH MUSIC; IRISH LAND LAWS.

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16. Great Britain — Wales. Wales derives its name from a Teutonic root meaning foreign, applied to the country by the English invaders of Britain. In Welsh it is called *Cymru* (formerly spelled *Kymry*), a name, in spite of a superficial resemblance, entirely unconnected with the Cimbri or the Cimmerii. The Welsh term for a Welshman is *Cymro* (plur. *Cymry*), a derivative of the old Celtic *Combros* (plur. *Combroges*), meaning a "fellow countryman." This name is now thought to have been given by the Welsh and the northern remnants of the ancient Britons to themselves in post-Roman times in their joint struggles against the English. Before this they seem to have used for themselves the general term Britons (Lat. *Britanni*, *Brittōnes*). For certain purposes, chiefly educational, Monmouthshire is now counted as part of Wales. In Roman times the chief tribes in Wales were the Ordovices in the north and centre, the Silures in the southeast, and the Demetæ in southwest Wales. In the post-Roman period, and until the assimilation of the Welsh territorial system to that of England, the chief divisions were Gwynedd (in the northwest), Powys (in the centre and northeast), Gwent (in the southeast) and Dyfed (in the southwest), together with the contiguous parts of South Wales. This latter division in its totality was often called Decheubarth (*i. e.* the south part). These divisions practically survive in the dioceses of Bangor, Saint Asaph, Llandaff, and Saint David's respectively. The country was anciently divided into cantrefydd (hundreds), and each cantref was usually divided into two cymydau (commotes). Some of these cantrefydd (pl. of can[t] (*hundred*), and tref (*homestead*), such as Rhufoniog (Romaniacus), in Denbighshire, Dunoding, the land of Dunod (from Do-

natus), in Carnarvonshire and West Merioneth, bear Latin names, and must have clearly obtained these names during or after the Roman occupation. The division into county and borough divisions is due to the assimilation of the Welsh territorial system to that of England. The title "Prince of Wales," derived from the ancient principality of Wales, is now conferred by the reigning sovereign on the heir-apparent. In recent times, the connection of this title with Wales has been emphasized by the acceptance of the office of Chancellor of the University of Wales by His Majesty King Edward VII., then Prince of Wales, and afterward by the present heir to the throne. Wales has also recently received recognition of her national emblem of the Red Dragon as part of the armorial bearings of the Prince of Wales.

The Welsh people, though comprising sub-varieties, form a distinct type among the peoples of the United Kingdom. The causes of this are largely physical and economic, acting from the remotest times, and on this basis the Welsh have developed a political, social and mental history of their own. The individuality of Wales is the more remarkable owing to her proximity to England and her exposure to English influences. The country stands, however, in the most obvious contrast to the central plain of England on which it borders, and its individuality has, to a great extent, a geographical basis. Wales consists almost entirely of a mass of mountains and uplands, intersected by various streams and rivers, the largest of which, the Dee, the Severn and the Wye, are on the east. In the lower valleys and the more level districts of the country, there are tracts of good land, but the upper valleys in the mountainous districts are subject to very heavy rainfalls, and are of little value for agriculture. There are also many large upland tracts, which can only be used for sheep-grazing. The population of rural Wales varies in density, but, owing to the smallness of the farms, it is often larger in proportion than in some of the agricultural districts of England. In the last century the distribution of the population of Wales underwent a great change by the discovery (especially in the south Wales coal-field) of great mineral wealth; and the consequent attraction of large masses of people into the industrial districts. These economic developments, too, have had a great effect on the social evolution of modern Wales.

Social Evolution and History.—The available evidence as to the prevalent type of the Welsh people shows that they are on the whole less fair, tall and bulky than the farmers of the English plains. They are, as a rule, more wiry and hardy than muscular, and a certain predominance of the nervous over the muscular system gives them, in certain districts especially, an air of keenness, sensitiveness and vivacity. The freshness of the air and the beauty and variety of the scenery also contribute to this end, as well as to an appreciation of linguistic aptness and poetic imagery. The excellent voices of Welshmen, too, are mainly due to the purity of the air. Brachy-cephalic types are rare, but mesocephalism prevails. Though the extreme blonde type is uncommon, there is a fair proportion of light or reddish hair, and, in south Wales especially, a considerable admix-

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ture of pale-faced, black-haired and markedly dolicho-cephalic men, who look as if their type had been evolved in the shelter of the ancient forests of the country. Generally speaking, it may be stated that the prevalent types are the natural counterparts of the conditions of life of the Welsh farmer and his dependents, with its hard toil, careful calculation and plain fare. Out of doors there is abundance of fresh air, but indoor ventilation is often sadly neglected, and in some districts phthisis is common.

The necessary interdependence of the members of the scattered communities of rural Wales has produced a certain sociability, fluency and aptitude for coöperation in public affairs, though in religious matters there is considerable cleavage. The chief religious denominations are the Calvinistic Methodists, the Independents and the Baptists. In purely Welsh districts crime is very rare. The conditions of Welsh agriculture from the remotest times, under necessities of soil and climate which often frustrated man's best hopes, have created a deep-rooted sense of man's dependence on powers that are beyond his control, and beneath the markedly religious spirit of the Welsh people there lies this fundamental instinct, the traditional intensity of which at times finds vivid expression. To this feeling are also linked a sense of the pathos of life, which has found utterance in Welsh poetry, a deep attachment to the soil, a minimizing of the importance of human distinctions in the face of the powers of Nature, and a passion for a kind of natural justice, which has expressed itself in modern times mainly in a demand for religious equality and the disestablishment and disendowment of the State Church, and in the desire to correct by means of education the disabilities of birth and station.

The social evolution of the country has been largely conditioned by its geography. This is such that the economic value of land varies greatly. Until recent times, the stress of competition was almost entirely for the surface products of the soil. The discovery of mineral wealth, however, has now given the economic, social and political evolution new directions. In the hunting, pastoral, fishing and agricultural life of man in the Stone, Bronze and Iron Ages, right down to modern times, whether Wales was invaded by Iberian, Goidel, Brython, Belgian, Roman, Saxon or Norman, the motive of the struggle was essentially the same, namely, the possession of the good lands of the country, such as the river valleys and the flatter districts afforded. In Wales, the records of the ancient system of land tenure suggest that the weaker and stronger communities came to be interspersed, the better type of holdings being held by freemen in family groups, while the unfree villagers farmed their land mainly by a system of co-tillage. The basis of social life was mainly tribal, and the necessary social adjustments produced a correlative body of custom and law.

The successive invasions of the country have left numerous archaeological traces, as for example, the fortresses of unmortared stone of which Trecerri in Carnarvonshire is an excellent instance. This fortress is now assigned by archaeologists to about 100-50 B.C. The Romans

developed the road communication; and worked some of the lead mines of the country. After the departure of the Romans, the western coasts were harassed by invaders from Ireland, and Britons from the north appear to have been invited to assist in their expulsion. Some of these families, notably that of Cunedda Woledig, remained in Wales and became the founders of Welsh local dynasties. The struggles against the English and the Normans brought war into the foreground of Welsh life. The conquest of Wales by Edward I. led to the establishment of a network of castles and garrison towns, governed by English law and custom, while the country districts remained Welsh. This led to constant friction, and the revolt of Owen Glyndwr (Glendower) was essentially a struggle of the country against the towns. The reign of Henry VII. (a descendant of an Anglesea Welshman, Owen Tudor) was hailed with great enthusiasm in Wales, but it was this prince and his son Henry VIII. who finally assimilated the Welsh legal system to that of England. Wales maintained its attachments to the Crown even through the Civil War, and until the second half of the 19th century was mainly conservative in politics.

The discovery of coal, slate, lead and other minerals, as well as the industrial and commercial revolution generally, has given the life of Wales a new aspect. In Glamorganshire, Monmouthshire, East Carmarthenshire, East Denbighshire and the slate districts of Carnarvonshire there are thriving and progressive industrial communities, with corresponding facilities for communication by land and sea. The rapid development in question is well exemplified in the case of Cardiff, (q.v.) which has grown in a few decades from being a moderate sized market town into one of the leading coal-ports of Britain. New docks, too, for Irish and Atlantic traffic have been built by the Great Western Railway at Goodwick in Pembrokeshire. There is in Wales a considerable sea-faring population and in Montgomeryshire, Carmarthenshire and Merionethshire there are some woollen factories. The industrial districts of Wales and the large towns of England, as well as the United States and the colonies, have absorbed the superfluous population of the Welsh country districts, until depopulation has in several places been the result. The price of agricultural labor has gone up, and, owing to the greater possibility of finding employment elsewhere, there is a more independent attitude toward the governing classes in religion and politics. Local government has more and more fallen into the hands of Liberals and Nonconformists, and there are now no Welsh Conservatives in the House of Commons, but the land-owners are mostly Conservatives. See GREAT BRITAIN: LOCAL GOVERNMENT.

Side by side with this development, there has grown up a desire for a measure of national self-government, especially in the sphere of education; and the first instalment of this was given in 1897 by the establishment of the Central Welsh Board for Intermediate Education, for the purpose of controlling the secondary schools founded under the Welsh Intermediate Education Act of 1889. These schools have made very rapid progress, and now contain over 10,000

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children. The establishment of the University of Wales, federating the University College of Aberystwyth (founded in 1872), Bangor (1884), and Cardiff (1883) is a phase of the same movement. Royal charters, too, have been granted for the foundation of a Welsh national museum at Cardiff and a Welsh national library at Aberystwyth. Several private collections of Welsh MSS. have been already bought for the latter. The great difficulty, however, in the way of complete national development and unification is the absence of a metropolis within easy reach of all parts. The most convenient meeting-place for the whole of Wales is Shrewsbury (the ancient Pengwern), which lies outside the Welsh border.

In addition to the foregoing factors of modern Welsh development, it should be stated that in the summer months there is a very great influx into Wales of visitors from England and elsewhere, in search of health and pleasure, and that for their accommodation whole towns have grown up along the coast. This link with England has helped to bring Wales into closer and closer touch with the outer world, while still living its own life and maintaining its individuality. Of the fine arts music and poetry are the only ones that have received extensive cultivation.

Language.—The Welsh language (called in Welsh *Yr iaith Gymraeg*) is an Indo-European tongue belonging, together with Breton and Cornish, to the Brythonic branch of the Celtic family. The first form of Celtic speech introduced into Wales in the Bronze period was probably Goidelic (to which Irish belongs), and Prof. Rhys thinks, from the evidence of the Goidelic Ogam inscriptions, that Goidelic lingered in Wales into the 7th century A.D. Welsh has undergone far more changes due to analogy and the like than Irish, and its grammar, which is now in the analytic stage, has been greatly simplified. About 800 Welsh words were borrowed from Latin during the Roman occupation of Britain. There are several dialects and sub-dialects of spoken Welsh, but the literary language has a historical tradition of its own. The spelling is almost entirely phonetic. Some of the river-names of Wales may be pre-Celtic. The Welsh language has a vigorous life, though English is now almost universally known. See **CELTIC LANGUAGES**.

Literature.—Wales has produced a very considerable body of literature, and the literary instinct is very widely disseminated among the people. The poetry contains many gems, especially as the poetic expression of the common lot and destiny of man. The oldest extant poem belongs to the 9th century A.D., but its form and diction show that there was already behind it a literary tradition. The earliest manuscript collections of Welsh poetry are the 'Black Book of Carmarthen' (12th century), the 'Book of Aneirin' (early 13th century), and the 'Book of Taliessin' (14th century). Several of the poems therein contained are shown by internal evidence to be pre-Norman. The literature of Wales is best viewed as a social product, secular and ecclesiastical. The mediæval prose writings are developments from the oral narratives told at the courts of the Welsh princes, annalistic expansions, transla-

tions from Latin and French, lives of the saints, Arthurian legends (q.v.) and other literature popular in the Middle Ages, such as the prophecies of the Sibyl and Merlin and the Helen and Charlemagne narratives. The mediæval poetry consists mainly of elegies, eulogies and hymns.

The chief literary centres at this time were the courts of the princes and the monasteries. After the decline of Welsh independence, Welsh poets still had many social patrons, and many poems were dedicated to them. The poetry of love and nature, too, which succeeded the older poetry of war, found expression in the beautiful verse of *Dafydd ab Gwilym* and his imitators. Another phase of poetry which flourished, especially in the 15th and 16th centuries, was that of minute description and epigrammatic conciseness. The metres tended to be intricate and difficult. The Reformation and the revival of learning led to the translation of the Bible, the composition of Welsh grammars (two of which are in Latin), the study of Welsh history and the composition of metrical versions of the Psalms. In the 18th century Welsh poetry and literature generally expanded into new types, and the result was the institution of the National Eisteddfod and of various societies for the encouragement of Welsh literature. The Eisteddfod has also given a great stimulus to the music of Wales.

During the 19th century Welsh literature and Welsh studies of every kind have been greatly advanced, and, in addition to the Welsh books published, there is a flourishing newspaper and periodical press. The national quarterly journals ('*Y Geninen*,' the *Leek*, and '*Y Traethodydd*,' the *Essayist*) often contain articles by Welsh scholars that are of high literary merit. The bent of the national mind at the present day is toward theology, philosophy, history, criticism and politics. The educational institutions of Wales are creating a public which demands critical thought and modern methods, but whose instinctive attachment to the main lines of Welsh life has preserved a love for those forms of literary expression in the Welsh tongue which are the inherited and natural correlatives of that life. Welsh literature tends to survive to-day, owing to the unwillingness of Welshmen to give up the language and forms of expression that are the psychical correlatives of the typical life of the land of which they themselves are the products. The prevalence of the Welsh language as the tongue of religion even in English towns, has its root also in the same instinctive feeling for the tradition of the life of the race. See **CELTIC LANGUAGES**.

For topography, climate, etc., see **WALES**, also the article **GREAT BRITAIN: GEOGRAPHICAL ENVIRONMENT**; for industries, commerce and trade see **GREAT BRITAIN: AGRICULTURE; MINING; FISHERIES; INDUSTRIES; COMMERCE; BANKING AND CURRENCY; RAILWAYS; SHIPPING**, etc.; for history, and further details on ethnology, language, literature, etc., see **WALES; CELTS; CYMRU; CELTIC LANGUAGES; GREAT BRITAIN: THE CONQUESTS; MEDIEVAL ENGLAND; ENGLISH HISTORY OF THE 17TH CENTURY; THE 18TH CENTURY; THE 19TH CENTURY**, etc.

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EDWARD ANWYL,

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THE CONTROL AND MOVEMENT OF WEALTH.

17. Great Britain—National Finance. National Debt.—The National Debt of the United Kingdom, in the sense in which the term is understood in several official returns, amounted on 31 March 1906 to £743,000,000, but in addition to this there were various amounts outstanding which had been borrowed for military, naval, and other works and brought the "Aggregate Gross Liabilities" up to £789,000,000. Further, a sum of £71,000,000 had been borrowed and lent to local authorities, and another sum of £25,000,000 had been borrowed for the purpose of establishing occupying land-ownership in Ireland by the expropriation of the former landlords. The total £885,000,000 nominally consisted of £585,000,000 of consolidated 2½ per cent stock ("consols") redeemable at par at the option of the State only after April 1923, £49,000,000 of nearly similar stocks and permanent debt to the Banks of England and Ireland, £30,000,000 of 2¾ per cent war stock and bonds which the State is bound to redeem at par in 1910, £43,000,000 of treasury bills and exchequer bonds repayable at various dates, £82,000,000 of the capital value of terminable annuities, £71,000,000 of local loans 3 per cent stock redeemable at the option of the State only after 1912, and £25,000,000 of 2¾ per cent Irish land stock, half of which is similarly redeemable after 1921 and the other half after 1933. But most of the terminable annuities, nearly 80,000,000 of the consols, and about 50,000,000 of the other securities are not in the hands of the public, but are held by the State itself against its liability to the savings bank depositors, so that it would give a truer account of the real position to say that the total debt consisted of about £685,000,000 in the securities just enumerated, and about

£200,000,000 in money payable on demand or at very short notice to savings bank depositors.

The main body of the debt is chiefly due to the wars in which the country was engaged between 1688 and 1815. During that period the debt grew from nothing (except a trifling sum which Charles II. had borrowed from the goldsmiths) to nearly £900,000,000. It then underwent steady diminution till in 1899 it had fallen to £628,000,000. The South African war brought it up again to £771,000,000 in 1903, since which year it has once more been diminishing. The £46,000,000 of works debt has all been incurred since 1890, and most of it since 1900, when it only amounted to £10,000,000. The amount lent to local authorities was only £8,000,000 in 1840, and £26,000,000 in 1887. The Irish land debt took its rise in 1891, but most of it is much more recent.

The interest and sinking fund of the Irish land debt is naturally provided for chiefly by the payments made by the new Irish landowners, who are paying for their land by instalments, but a portion falls on funds which would otherwise benefit Irish local taxpayers and another portion is defrayed by the taxpayers of the United Kingdom. The local loans debt is adequately provided for by the interest and repayments received from the local authorities. The works debt is made a charge upon the annual parliamentary votes for the departments concerned, in such a way that each loan will be extinguished in 30 years at most. For the main body of the debt the practice has been since 1876 to devote by legislation a certain annual sum, called the "permanent" or "fixed" annual charge, to interest and repayment taken to-

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gether. As the sum thus devoted considerably exceeds the interest, this plan, if carried out without modification and without interruption owing to fresh borrowing, would practically convert the whole debt into a terminable annuity, and extinguish it in a very moderate length of time. But as a matter of fact the "fixed charge" was reduced from £28,000,000 to £26,000,000 in 1888 and by two steps to £23,000,000 in 1900, and it was only the fresh borrowings of the South African war which led to its restoration to £28,000,000 in 1905. The difference between the "fixed charge" and the interest is sometimes called the "New Sinking Fund." The "Old Sinking Fund" is any actual surplus realized in the year. The general law is that this also must be devoted to repayment of debt, but when any considerable surplus happens to be realized, special legislation usually interferes with the operation of the rule.

Expenditure.—The total expenditure on revenue account for the financial year 1905-6 is stated at £140,500,000, to which may be added £10,000,000, the yield of certain general taxes which is paid over to local authorities without being technically received into the Exchequer. The total may be classified conveniently as follows: Fixed annual charge for the main body of the debt, £28,000,000; army, £29,000,000; navy, £33,000,000; education, £16,000,000; miscellaneous, including the cost of collection of taxes, the administration of justice and the civil services not included under heads already enumerated, £17,000,000; post office, including telegraphs, £16,000,000; and amount handed over to local authorities, £11,000,000. The amount credited to education is chiefly made over to local school authorities, but only on conditions which give the central government a very large measure of control, not only over the expenditure of the money so granted, but also over what is raised from local sources. The £11,000,000 granted to local authorities, commonly called the "Exchequer Subsidies" or "grants in aid of rates," consist of sums which are either fixed or vary with the yield of certain taxes, and are not now directly connected with central control, with the exception that an amount equal to half the cost of the pay and clothing of a police force may be deducted from the grants due to an authority if it fails to maintain its police force to the satisfaction of inspectors employed by the central government. The method of distribution between the various authorities is extremely complicated, and differs in England, Scotland, and Ireland. Scarcely anyone professes to understand it, and it is based on no sort of principle except that it is largely dependent on certain proportions which prevailed in 1888. This plan was adopted as a temporary expedient, and has been continued not on account of its merits, but because it existed.

Revenue.—The total revenue, including the £10,000,000 of allocated taxes already mentioned, amounted to £154,000,000. The great heads were: Customs, £34,500,000; excise (internal duties on commodities), £35,600,000; estate duties (inheritance taxes), £17,300,000; income tax, £31,300,000; stamps, £8,200,000; house duty, £1,900,000; post office and telegraphs, £21,000,000; and miscellaneous revenue, £3,800,000. The

customs included only one export duty, that imposed upon coal, producing £2,300,000, and this was abolished in 1906. The imports of tobacco brought in £13,400,000, tea, £6,800,000; sugar, £6,200,000; spirits, wine, and beer, £5,100,000. The excise drew in one way and another nearly £33,000,000 from taxes on the manufacture or sale of beer and spirits, so that nearly £38,000,000, or 30 per cent of the whole tax-revenue, was derived from intoxicating liquors. The inheritance taxes, christened by Gladstone and now commonly called the "Death Duties," consist of two distinct parts, one of which is graduated from one to eight per cent according to the aggregate value of the whole property left by the deceased; so that if a man dies worth £400, one per cent has to be paid, and if he dies worth over £1,000,000, eight per cent. The other part is graduated according to the relationship of the new owners of the property to the deceased, so that for example, while property bequeathed to descendants or ascendants is exempt, property falling to brothers or nephews is charged three per cent, and property falling to persons without any relationship to the deceased is charged 10 per cent. Thus, taking the two parts together, if a man leaving £400 bequeaths it all to his children, one per cent only will be paid, while on a millionaire's estate left to persons not related to him, the duties will together amount to 18 per cent. The Income Tax was levied at the rate of 1s. in the £ (i. e. five per cent), but incomes under £160 are exempt, and "abatements" are allowed on incomes between £160 and £700, which, when the rate is 1s., amount to £8 to persons having between £160 and £400, £7 10s. when the income is between £400 and £500, £6 when between £500 and £600, and £3 10s. when between £600 and £700. Much the greater portion of this tax is "collected at the source," or at any rate before the income actually reaches the ultimate recipient. For example, the tax on the income arising from lands and buildings is collected from the occupier, who then, if he is not the owner, has an inalienable right to deduct the tax when paying his rent; so too the tax on the income from stocks, shares, and bonds of corporations is collected from the corporation. But this practice does not defeat the right of the individual landowner or stockholder to exemption or abatement if his total income from all sources is under the prescribed limits; he makes up accounts with the collectors, declaring his whole income and showing how much has been deducted from its various parts, and if it then appears that too much has been paid, the excess is repaid to him in cash. So far as the portion collected at the source is concerned, the tax works with great efficiency. The amount of evasion which takes place in regard to the other part, for which personal declarations of the amount of income are required, is very variously estimated, but there is little doubt that it is in process of diminution owing to the greater publicity of modern methods of business and to the checks supplied by the death-duties, which are administered by the same department. Stamps consist mainly of duties on commercial and speculative transactions. The House duty is levied at the rate of 9d. in the £ (3¾ per cent) of the rental value, but there are lower rates

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for houses of between £20 and £60 rental value, and houses under £20 in Great Britain and all houses in Ireland are exempt. The Post and Telegraph receipts include a heavy tax of 10 per cent on the gross takings of the National Telephone Company, as well as the receipts of the Post Office from its own telephone trunk wires and its telephone service in London and a few other places where it competes with the National Company. The whole of the Post Office profit comes from the mails, the telegraph business being a losing one. In miscellaneous revenue the most important item is about a £1,000,000 from the Suez Canal Company's shares, which, it is well to remember, are a wasting property, the canal having been constructed on a 99-year concession.

Local Finance.—To give an absolutely accurate account of the finances of local authorities in the United Kingdom is impossible owing to the complicated relationship of the various local authorities to each other and to the central government, and also because the three kingdoms, England, Scotland, and Ireland, have entirely different systems and methods of accounting. The aggregate debt in 1904, including of course the £71,000,000 of debt to the central government mentioned above, is stated (after deducting accumulated sinking funds) at about £450,000,000, but about £40,000,000 of this consists of the debt of harbor and dock trustees which is secured only on the harbors and docks, and in no way upon the taxes of any locality, and therefore ought not to be reckoned as local debt. The remainder represents capital invested in (taking the larger of the various items approximately in order of magnitude) waterworks, street and road improvements, schools, drainage, gasworks, tramways, electric works, workhouses, asylums, and the innumerable other works and buildings required by modern civilized and especially urban communities. The aggregate annual repayments of debt and payments to sinking funds amount to a little over two per cent on the total, but the annual additions considerably exceed this amount, so that the debt increased nearly £200,000,000 in the 10 years before 1904. Since then there has been an exceptional increase owing to the conversion of the capital of the London water companies into debt of a board representing the various local authorities within the area of supply; this adds about £40,000,000 without much altering the liabilities of the inhabitants or owners of the area concerned. About half the total capital has been raised for purposes which are often provided for by private enterprise, such as waterworks, gasworks, docks, electric works, tramways, and cemeteries, and the other half for purposes which are seldom so provided for in modern communities.

The expenditure from revenue of the authorities, including repayment of debt, amounted in the year 1902-3 to about £111,000,000. About £15,000,000 of this was met by the allocated taxes and other national grants, chiefly for education, spoken of above, about £58,000,000 by "rates," and the rest by the special charges levied for commodities and services supplied, and all kinds of miscellaneous revenue. The accounts of subsequent years will show very large increases in the national grants for edu-

cation received by the local authorities, not only because the grants for education have actually increased, but also, and in much larger measure, because under the Education Act of 1902, the local authorities now receive the grants for the "voluntary" schools handed over to them by the act. The amount raised by special charges for commodities supplied will also be very largely increased in consequence of the fact that Londoners' payments for water are now received by a local authority, instead of by a number of companies.

The "rates" are taxes levied by the local authorities at a rate of so many shillings or pence in the pound of the annual value of land and all things attached to the land in the concrete form of buildings or works of any kind. The idea of the Elizabethan rate for the relief of the poor undoubtedly was to assess inhabitants according to their ability, and down to 1840 attempts were frequently made to extend the system which long prevailed in some parts of the country of assessing stock in trade and other visible personal property. But experience showed that such taxation was utterly unsuitable for small localities, and when the law courts at last began to favor these attempts, legislation intervened. The tax is usually levied from the owner in the important case of small house property in England, but in almost all other cases from the occupier of the property. The occupier has no right of deducting rates paid from his rent unless he has so contracted with his landlord, and a contract of this kind is scarcely ever made. There is at present, under the Agricultural Rates Act, a rebate of 50 per cent in favor of agricultural land, and there are some other differentiations in the cities. The "rates" are elastic, certain, cheaply collected, and singularly free from disturbing effects upon production. The fact that they are unpopular is sufficiently accounted for by their enormous yield and their obvious character.

Financial Control.—The finance of the central government, according to the present theory of the British Constitution, is vested in the House of Commons. All financial legislation must originate there, and the Commons will not permit any alteration of their measures by the Lords. But in the House of Commons itself the power of initiation in matters of finance is now entirely in the hands of the Ministry. Estimates of expenses and receipts made up in the government departments are considered or amended by the Ministry in private. The result is then laid before the House of Commons by the Chancellor of the Exchequer in his "Budget Speech." A ministry will rarely submit to modify its proposals in any important respect, so that the House has to choose between acceptance of the budget and a change of government. No ordinary member of the House can directly propose an increase in taxes or expenses, the theory being that it is the King who asks his faithful subjects for money, but anyone may propose reductions. The estimates are put before the House in immense detail, but this very detail defeats its own end, as there is not and cannot be, time to consider the whole to any good purpose. The estimates are consequently passed without material alteration. This absence of real control by the House of

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Commons is probably favorable rather than unfavorable to economy. The necessity of finding new taxes or increasing old ones is much more immediately before the eyes of the Ministry than of the House of Commons, and the Ministry has also more reason to fear popular resentment against any increase of taxation. It is, moreover, in immediate and constant association with permanent Treasury officers whose influence is generally cast against temporary expedients for staving off the day of reckoning.

In the councils which conduct the local government of the country there is nothing like the Ministry in Parliament, and the system of control consequently has a nearer resemblance, as has sometimes been observed, to that prevailing in the United States Congress. The committees charged with the various departments of the council's work, with the assistance of their executive officers, each prepare their own estimate of expenses for the coming year. These are then all added up and put before the Finance Committee, which usually hands them on with little or no alteration to the Council, merely adding its own estimate of receipts other than rates and a recommendation to the Council to make a rate of as many pence in the pound as is calculated to make up the balance required. The Council discusses the estimate of receipts and expenses thus put before it, and any member may move alterations in any item. Such motions are frequently made and sometimes, especially, of course, in the smaller councils, carried.

The local authorities have no power to contract debt without special authority. For most purposes this now means that sanction must be obtained either from Parliament by special act or from the department of the central government, called the Local Government Board. Loans must always be accompanied by provisions for repayment within the time for which Parliament or the Local Government Board's inspectors calculate the work on which the money is to be spent will last. That the prescribed sum is being set aside every year for repayment is ascertained by the Local Government Board in each case. Some authorities are forbidden by statute to borrow more than an amount bearing a certain proportion to the annual rateable value of their area, but these enactments are rendered practically inoperative by other legislation, and have no influence whatever.

Out of annual revenue the authorities may generally spend as much as they please, the unpopularity of rates being regarded as a sufficient safeguard against extravagance. In regard to one expenditure only, that for poor relief, the central government attempts to prevent too much being spent, at any rate in one or two directions, such as relief to persons not required to enter the workhouse and relief to the able-bodied. In other matters the influence of the central government, when exercised, is almost always in favor of increased expenditure. The threat of "withdrawal of the grant" in respect of a particular school is used every day by inspectors of the central Board of Education in order to compel a local authority to spend more. The central government appoints officers to audit the accounts of the greater number of local authorities, but the auditors of the municipal bor-

oughs (which include all the great cities) in England are elected, under the Municipal Corporations Act of 1832, by the ratepayers. This election is almost always a farce, and the more important city councils have had to provide a proper audit in addition to the one thus provided by law.

Bibliography.—Information as to the actual position of British finance can only be obtained by piecing the facts together from a large number of parliamentary publications, usually known as "Blue-books." Among the most important of these are the annual returns entitled 'National Debt,' which shows the different kinds of debt existing at the end of each year, from 1835 to 1906; 'Government Departments Securities,' which gives the amount of the State's securities held by the State itself; the Finance Accounts of the United Kingdom; the 'Postmaster-General's Report,' the 'Annual Local Taxation Returns for England and Wales,' and the same for Scotland and for Ireland. Besides the above, for historical purposes the following parliamentary papers may be found useful: 'History of the earlier years of the National Debt from 1694 to 1786' (C. 9010), and 'Proceedings of the Commissioners for the Reduction of the National Debt from 1786 to 1890' (C. 6539); 'Local Authorities Liabilities (No. 306 of 1905)'; 'Reports of and Evidence taken by the Royal Commission of 1897 on Local Taxation.' Among general works on finance dealing preëminently with British conditions C. F. Bastable's 'Public Finance' (3d ed. 1903), is the most complete and up-to-date and gives plentiful references to earlier works. For the history of taxation, consult Stephen Dowell, 'History of Taxation and Taxes in England' (2d ed. 1888), and Cannan, 'History of Local Rates in England' (1896).

EDWIN CANNAN,
Appointed Teacher of Economic Theory in the University of London; Author of 'History of Local Rates in England,' etc.

18. Great Britain—Banking. Banking in Great Britain as now carried on is the product of a continuous process of evolution; it owes very little to external influences, and can only be properly understood in the light of the study of its earlier developments. Its strength is the strength derived from long tradition founded upon experience, and its weakness is the weakness inherent in a system which has developed with the smallest possible amount of legislative control. This weakness is shown in a lack of logical coherence and in an occasional absence of proper definition.

There are few evidences of banking in the modern sense of the term in England before the 17th century. In the middle ages the bankers were mainly money changers and money lenders; they dealt in coin, not in credit. The Italian colony of the Lombards, however, who gave their name to Lombard street, seem to have been well acquainted with the use of bills of exchange, and the banking business of the country was chiefly in their hands after the expulsion of the Jews at the end of the 13th century. During the 16th century, however, the power of the colonies of foreign merchants in London rapidly declined, ending in the breaking up of

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the German colony in the Steelyard by Queen Elizabeth. In the 17th century it became customary for the wealthier classes to intrust their spare cash to the keeping of the London goldsmiths, a body of men whose occupation inspired the necessary confidence. The transition from goldsmith to banker was a natural and easy one, and the goldsmiths' "cash notes" gradually acquired a degree of negotiability. Some of the existing London private bankers find their origin in the goldsmiths of the latter half of the 17th century. Outside London the early type of country bankers was evolved from the class of substantial merchants. Thomas Smith of Nottingham, for instance, who is the earliest country banker of whom we have any record, and who certainly carried on business as early as 1688, originally combined the business of a mercer with that of a banker.

Owing to the unsatisfactory condition of the public finances under the Stuarts, there was no opening for a public bank such as existed in Amsterdam and other European centres of industry. But the Revolution of 1688 saw the control of the national expenditure pass from the Crown to Parliament. The national credit became, for the first time, an important factor in our economic development, and showed itself in the growth of a national debt. The use of credit spread rapidly and this led to the development of modern banking. To the efforts of William Paterson was due the establishment in 1694 of the Bank of England, founded under the wing of the Chancellor of the Exchequer, Charles Montague, with the object of lending the whole of its capital, £1,200,000, to the State.

The Bank of England.—The Bank of England is the pivot round which centres the whole of modern banking in the United Kingdom. In no other country, whether in Europe or America, does a bank occupy quite an analogous position. It is not a State bank in the strict sense of the term; its capital is held privately, and its management is not in any way directly or indirectly controlled by the State. On the other hand, during its whole history, it has been more or less under the protection of the State; its operations have been on occasion dictated by the State; its development has been marked by successive loans of its capital to the State in return for the confirmation or extension of its privileges, and it still continues to exercise powers and owe responsibilities delegated by the State.

The Bank of England is controlled by a governor, deputy-governor, and a court of 24 directors who are elected by the proprietors on the nomination of the directors. The selection is generally made from the members of leading mercantile firms, and the tradition is not to elect a member of a banking firm or a director of another joint-stock bank. The operations of the Bank are now regulated by the Bank Charter Act of 1844. This act divides the Bank of England into two departments, the Issue Department and the Banking Department. The former, as will be seen in a later section, is so strictly regulated by the act that its action is automatic. The latter is for all practical purposes as free from legal restrictions as any other joint-stock bank. Yet free as it is from special legal obligations, it has, by its action in the past

as well as by its present position, assumed peculiar responsibilities, which, though ill defined, are well understood, and which the Bank does not attempt to disown. These responsibilities are due especially to the Bank's position as the Government banker, the bankers' banker, and the keeper of the country's reserves. The Government accounts are kept by the Bank of England, the national debt is managed, exchequer bonds and treasury bills are issued and paid, and many other incidental services of the kind are rendered by the Bank. With regard to the other banks, all the settlements at the London Bankers' Clearing House are made by transfers at the Bank of England, where each clearing bank is bound to keep an account. Those banks which do not possess a seat in the Clearing House find it necessary to appoint one of the clearing bankers as agent and to keep an account with that agent. Practically every banker in England can, therefore, draw either directly or indirectly upon the Bank of England, and the reserve of the latter has thus to be regarded both as the banking reserve of the country, and also as the gold reserve, that is to say, the reserve to insure the convertibility of the note issue.

Appended is a copy of a weekly return of the Bank of England.

BANK OF ENGLAND.

AN ACCOUNT, pursuant to the Act 7th and 8th Victoria, cap. 32, for the Week ending on Wednesday, the 13th day of June, 1906.

Issue Department.

Notes issued	£51,803,190
	<u>£51,803,190</u>
Government debt	£11,015,108
Other securities	7,434,900
Gold coin and bullion	33,353,190
Silver bullion .....	.....
	<u>£51,803,190</u>

Banking Department.

Proprietors' capital	£14,553,000
Reserve	3,251,045
Public deposits (including exchequer, savings banks, commissioners of national debt, and dividend accounts)	9,050,109
Other deposits	42,741,064
Seven-day and other bills	91,544
	<u>£69,686,762</u>
Government securities	£15,977,133
Other securities	29,125,443
Notes	23,169,450
Gold and silver coin	1,414,736
	<u>£69,686,762</u>

Dated the 14th day of June, 1906.

J. G. NAIRNE, *Chief Cashier.*

The Private Bankers.—During the 18th century, all the banks in England, with the exception of the Bank of England, were private partnerships, the number of partners being limited by an act passed in 1708 to six. Now, however, private banks are very few in number, and their influence is a diminishing one, though at one time that influence throughout the country was

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great, both socially and politically. The London private bankers ceased to issue notes toward the end of the 18th century, but the country private bankers attached great importance to their note issues up to the time when the Bank Charter Act of 1844 made further extension in this direction impossible. Many of these firms were under-capitalized; the banker was often a tradesman as well, and was too much at the mercy of fluctuations in trade. Consequently in time of monetary stress failures were frequent, especially during the early half of the 19th cen-

trast to that existing in the United States of America. The natural consequence is that the magnitude and importance of the individual bank has very greatly increased. Yet, large as the liabilities of the leading banks to the public are, their capital, both nominal and paid up, and their reserve funds, are sufficiently ample to remove any feeling of distrust which might otherwise be inspired by the volume of their obligations, as will be seen from the accompanying figures taken from the balance sheets of a few of the most important joint-stock banks.

Date.	Bank.	Subscribed Capital.	Paid up Capital.	Reserve Fund.	Current & Deposit Accounts.
1906		£	£	£	£
June 30th	Lloyds Bank Ltd.....	24,072,500	3,851,600	2,900,000	62,822,429
"	Union of London and Smiths Bank Ltd.....	22,034,100	3,554,785	1,150,000	36,642,368
"	National Provincial Bank of England Ltd.....	15,900,000	3,002,000	2,300,000	51,206,048
"	London City and Midland Bank Ltd.....	15,085,880	3,142,850	3,142,850	50,320,316
"	Barclay & Company Ltd.....	8,000,000	3,200,000	1,500,000	44,407,970

try. Except that their note issue is limited by the Act of 1844, the law imposes no restrictions upon private bankers, and they are not even compelled to issue balance sheets, though in most cases this has been voluntarily done of recent years. In spite of this absence of control, the existing private banks inspire a confidence which seldom proves misplaced. Most of them have been established for many years, for it has proved increasingly difficult for a new private bank to obtain a footing in the country. All banks possessing more than 10 partners must now register as a company under the Companies Acts.

The Joint-Stock Banks.—Owing to a clause in the Bank Charter Act of 1708, joint-stock banking was not possible during the 18th century, but in 1826 the Bank of England monopoly was so far curtailed as to allow joint-stock banks to be established, with the right of issuing notes, provided they had no office in London or within a radius of 65 miles. By an act passed in 1833, joint-stock banks were permitted within this radius, provided they did not issue notes, and under this act several of the leading joint-stock banks of to-day were founded. The legal disability to issue notes continues until the present day, and has had a marked effect on banking in England. The energies of the joint-stock banks have naturally been centred upon the development of deposit banking, with the result that the habit of keeping a banking account has spread more rapidly and more generally than in most countries, and the use of notes has correspondingly decreased. Practically all the existing joint-stock banks have registered under the Companies Acts with limited liability, and in most cases with a reserve of uncalled capital which cannot be utilized except in case of liquidation. During the last 20 years or so a decided tendency has shown itself, on the one hand, for the amalgamation of the private banks and the smaller joint-stock banks with the more powerful of the latter class, and on the other hand for the spread of branch banking. This has resulted in an increased centralization of the banking system in London, and to a lesser extent, in a few of the leading provincial towns, and in the evolution of a system which is in distinct con-

trast to that existing in the United States of America. The natural consequence is that the magnitude and importance of the individual bank has very greatly increased. Yet, large as the liabilities of the leading banks to the public are, their capital, both nominal and paid up, and their reserve funds, are sufficiently ample to remove any feeling of distrust which might otherwise be inspired by the volume of their obligations, as will be seen from the accompanying figures taken from the balance sheets of a few of the most important joint-stock banks.

JOINT-STOCK BANKS (including the Bank of England).

	No. of Banks.	Paid up Capital.	Reserve Fund.	Deposit & Current Accounts.
		£	£	£
Eng. & Wales..	60	62,735,042	36,828,476	679,567,025
Scotland.....	11	9,316,070	7,999,940	100,042,554
Ireland.....	9	7,309,231	4,020,500	53,556,076
Isle of Man & Channel Isls.	2	80,000	91,500	1,067,808
	82	79,440,343	48,860,416	834,833,453

PRIVATE BANKS OF ENGLAND AND WALES.

Number of Banks.	Partners' Capital and Reserve.	Deposit & Current Accounts.
	£	£
22	4,393,905	27,775,019

Foreign and colonial banks having London offices are, it should be noted, not included in the above tables.

Note Issues.—The Bank Charter Act of 1844, which governs the note issues of English banks, aimed at the eventual extinction of all note issues except that of the Bank of England. This aim is in a fair way to be realized, for at the end of April 1906, only 31 banks possessed the right of issuing notes, the maximum authorized issues amounting to but £1,628,342, and the actual circulation being £577,864. By this act the Bank of England was authorized to issue from the Issue Department £14,000,000 of notes, covered by Government securities, £11,015,000 of which consisted of the Government debt to the Bank. This fiduciary issue could be increased by the addition of two-thirds of the authorized issue of any other bank which forfeited its right of issue or allowed it to lapse, and it amounts at the present time to £18,450,000. Any notes issued in excess of this total

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must be secured by the deposit of coin or bullion to an equal amount. Silver may form not more than one-fifth of this deposit, but the Bank has but seldom availed itself of this privilege. As the Issue Department is compelled to buy all standard gold bullion offered to it at the rate of £3 17s 9d an ounce, and always issues notes against the stock in hand, it can be seen that the amount of notes issued is controlled to a very small extent by the bank directors, and that it increases or decreases according to the amount of gold imported or exported. The Bank of England is, however, not prevented from offering a higher price than the above, should it find it advisable to compete for gold in the market; and in selling gold, if the demand is for foreign coin or bars, the Bank can fix its price according to the demand. Any notes not required in active circulation are held in the Banking Department and form the greater part of the Bank of England reserve. The active circulation is in normal times peculiarly steady, averaging from 25,000,000 to 30,000,000 out of a total issue of from 50,000,000 to 55,000,000.

Bank notes have been in England largely superseded by the general use of banking accounts by the public, and the demand for an elastic currency has never assumed such proportions as in the United States. In times of stress, however, the demand for notes has, in a few instances, exceeded the Bank's power of issue, and on three occasions, in 1847, 1857, and 1866, the Government has been compelled to intervene and suspend the clause forbidding the issue of notes beyond the fiduciary limit except against the deposit of gold. Bank of England notes, which it may be noted are legal tender in all payments except by the Bank and its branches, are not issued for any sums below £5, though proposals have frequently been made, notably by Viscount Goschen in 1891, to authorize the issue of £1 notes.

The Clearing System.—The system of collecting checks and settling balances owing between bankers, though to the uninitiated it may appear merely an administrative detail, has, in reality, exercised a very important influence on banking development in England. The problem of clearing checks is comparatively simple compared with the problem as existing in the United States or any other country occupying a large geographical area, because practically every English bank or branch bank is within a day's post of London. Consequently although local checks are cleared through local Clearing Houses in some of the larger towns, the great mass of checks is cleared through the London Clearing House, and this fact has very much accentuated the centralization of banking in London, which is the predominant characteristic of the English system. A seat in the Clearing House is a privilege jealously guarded and difficult to obtain, and it was not until 1854 that any of the joint-stock banks were admitted. Those banks which do not possess this privilege appoint a clearing agent, with whom an account is kept, and who in many cases acts generally as the London agent. By the rules of the Clearing House every clearing bank must keep an account with the Bank of England, and the daily differences are settled by means of transfers to

and from these various accounts and a central account called the Clearing Bankers' Account.

The total amount of the checks and other articles cleared through the London Bankers' Clearing House in 1905 was £1,287,935,000, being the highest total recorded in the history of the House, and more than 16 per cent higher than the previous year. The largest weekly total was £345,370,000, and the largest daily amount £102,780,000. The number of banks possessing seats in the Clearing House is now eighteen.

The Money Market.—The London money market is the name given to the miscellaneous body of persons who borrow or lend money for short periods, their operations being roughly grouped around Lombard street, Threadneedle street, and the adjoining parts of the City of London. The money in which they are interested is sometimes described as the Short Loan Fund of the Money Market. On the one hand is the borrowing portion of the market, consisting largely of the bill brokers, the Stock Exchange, and an undefined group of financiers; on the other, the Bank of England, which is closely connected with the Money Market, and which, owing to its position as the guardian of the ultimate cash reserves, is also the ultimate lender when money cannot be easily borrowed elsewhere. In between these two extremes are the clearing banks and other banks having London offices, as well as various financial firms, whose surplus unemployed assets form the principal part of the Short Loan Fund. The British Government also plays a very important part as a borrower in the Money Market, and the Government of India, through the India Council, lends largely to the Market. Beside these, there is a group of foreign banks with London offices which exercise a growing influence in the Market, both as borrowers and lenders.

The index to the general condition of the Market is the Bank Rate, which is the official minimum rate at which the Bank of England discounts first-class bills offered to it. All bills so offered for discount must mature within not more than three months, and must be accepted payable in the United Kingdom and bear one other English signature. The Bank of England is actuated in fixing the amount of the Bank Rate by the state of the reserve and the prospects of an inflow or outflow of gold, and speaking generally, the Bank is interested in keeping the rate as high as expediency will allow. The borrowing portion of the Market is naturally anxious to keep the rate as low as possible. If, however, there is plenty of money to be lent outside the Bank of England, the Bank Rate cannot be effectively maintained at a much higher figure than the market rate, otherwise it would be merely nominal. Therefore, the other London banks to a large extent hold the balance between the Bank of England and the borrowing portion of the Market. They are actuated on the one hand by the necessity of employing as large a proportion of their surplus assets as prudence will allow, and on the other by the responsibility of keeping reserves well above the margin of safety. The relations of the Bank of England to the other banks are of the utmost importance and interest. It is possible that in seasons when money

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is plentiful, the enormous floating balances available for employment in the Money Market may expose the Bank of England to the danger of a drain of gold. This risk is accentuated by the fact that the funds controlled by the joint-stock banks are far larger than those of the Bank of England. The Bank must, therefore, be able to control the market rate should necessity arise, and it must do this by itself coming forward as a borrower (mostly through a broker) and by offering such a rate as to divert the loanable funds of the other banks away from the market. The latter, thus being denuded of funds, is driven to the Bank of England.

The Gold Reserves.—London is recognized as the only free market for gold in the world, and yet her central stock of the metal is, notwithstanding the enormous volume of her financial dealings, at times actually less than that of her principal rivals. It is one of London's most cherished traditions that she puts no obstacles in the way of the export of gold, except by making it more worth the while of its owners to keep it there. When it is remembered that the British banks owe some £900,000,000 sterling to their depositors, and that chiefly owing to the universal reputation of the London sterling bill of exchange as an international currency, London's obligations to the rest of the world are at all times enormous, it will be realized that her gold reserves have to be vigilantly watched and jealously guarded.

That London can work on such a small basis of gold is due in the first place to the fact that the English system of a single centralized reserve is a more economical one than the system prevailing in countries where centralization is less developed; secondly, to the smooth working and thorough organization of her banking system, and thirdly, to the excellent reputation of English credit among other nations, which enables her to attract gold from abroad with the least possible delay. But there is a growing feeling that there should be more gold held in reserve in the country; not that bankers are thought to be working below the safety limit, but because the necessity for incessant vigilance results in unstable rates of interest with a consequent derangement of the Money Market and an undue accentuation of the speculative element in business generally. This feeling has been especially prominent since other countries have adopted a gold standard, and many schemes for an improvement of these conditions have been brought forward. The settlement of the question is rendered more difficult by the dual nature of the Bank of England reserve, which is at the same time a currency reserve and a banking reserve. It is felt that the responsibility of keeping the former belongs partly to the State; that of the latter to the banking community; and the adjustment of the responsibility has not proved easy.

Banking in Scotland and Ireland.—Both in Scotland and Ireland banking has developed on slightly different lines from those of English banks. In Scotland especially the absence of any joint-stock monopoly like that of the Bank of England resulted in the early evolution of a type of powerful bank which crowded out the private banker. Consequently to-day there are only 10 banks in Scotland, all with a large num-

ber of branches, and the establishment of a new bank is practically impossible. The Scotch people were early in recognizing the advantages of a good banking system, and the use of "cash credits" had an important effect upon the industrial development of the country. In Ireland, banking has had a stormier history, but similar results have been reached, and there are now only nine banks of any importance in the country. Both Scotland and Ireland differ from England in enjoying a circulation of £1 notes, which have survived all attempts at extinction.

The note issues of the two countries are governed by Bank Acts passed in 1845, which bear a close resemblance to each other. All the banks in Scotland and six of the Irish banks are banks of issue, and each is allowed to issue an amount equal to the average circulation during the year ending 1 May 1845, together with an amount equal to the amount of gold and silver coin held at the head office or principal places of issue, the silver coin not to exceed one-fifth of the whole. The necessity for keeping coin against excess issues of notes brings the Scotch and Irish banks into close relation with the Bank of England. Neither the Scotch nor Irish banks clear their checks through the London Clearing House, but through the Clearing Houses of Edinburgh, Glasgow, and Dublin, hence the connection between these banks and the Bank of England is not necessarily so direct as in the case of English banks. But there are certain recurrent seasons of the year when an increase of the note issues always occurs in Scotland and Ireland, and this necessitates an increase in the stock of coin. As there is no central reserve of gold in Scotland and Ireland, this coin can only be obtained from the Bank of England, and therefore, at these seasons of the year, notably during what is called the Autumn Drain, the Bank of England reserve is always subject to a demand for coin from these countries, especially from Scotland.

Banking Methods.—British banking methods are distinguished by prudence and caution. The immense amount of their deposits repayable on demand forbids English banks to embark upon the general financial business which forms the principal function of some Continental bankers. English banks do not operate on the Stock Exchange except for purely investment purposes, and then only in what are termed "gilt edged" securities. Neither do banks directly interest themselves in the control or management of commercial or industrial undertakings. Furthermore the management of the large banks is singularly free from political interference of all kinds. On the other hand, English bankers have allowed to slip from their control many branches of business which belong legitimately to a banker. Much of the bill-discounting business is in the hands of the bill broker, who is an expert middleman between the banker and his customer. Again, few of the large London banks deal in foreign bills or interest themselves in foreign exchanges, and this branch of banking has also fallen largely into the hands of specialists, or of the branches of foreign banks established in London.

The liabilities of English banks consist almost entirely, first, of the current account

balances in their hands, repayable on demand, on which it is not usual to allow any interest, and secondly, of sums deposited repayable at a fixed notice, usually seven days, on which London bankers allow interest at one and a half per cent below the Bank of England Discount Rate. Certain London bankers also accept, on behalf of their customers, bills drawn from abroad, proper security being deposited to cover the bankers' liability. It is, however, not the practice among English bankers to grant open credits in such cases. Their assets consist of cash on hand and at the Bank of England or their London Agent, money lent at call or short notice to the Money Market against security, bills being the acceptances of other bankers or leading merchants bought in the market investments in first-class Stock Exchange securities, and advances to customers, either in the form of loans, overdrafts upon current account, or bills discounted. It is not usual to make advances without some form of security.

During the middle of the 18th century, England was subjected to a series of acute banking crises, notably in 1847, 1857, and 1866, but if we except the grave situation created in 1890 by the liquidation of Barings, who, it must be noted, were not bankers, the country has been free from such disturbances since 1878. It is reasonable to assume that bankers have profited from the experience gained in such times of stress, and it must be admitted that English bankers as a whole inspire in their creditors the confidence due to sober and prudent management.

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19 (a). Great Britain—Commerce—Eighteenth Century. English commerce of the 18th century is remarkable for the revolution in the methods by which it was carried on, for its growth under the great Whig system of protection and for its culmination in a tremendous expansion with the coming of machinery. English foreign trade had been largely opened out by merchant companies. The foundation idea was that English goods should be sold at a high price and that there should be no glut of goods, no undercutting, but a "well ordered trade." Hence rules as to quantities to be exported were a great feature of these companies. There was no idea of pushing trade or selling at a low price and getting quick returns. Moreover, the numbers admitted to the companies were limited by the high fees charged for entrance, while no one who did not belong to them could lawfully engage in the trade. The only open trades were those to France, Spain and Portugal. Hence a regular attack on the monopoly of the companies was carried on and this constituted the early free trade movement. It was successful; after the Revolution the entrance fees of the companies were reduced by Acts of Parliament; only the East India Company and the Hudson's Bay Company continued strict monopolies. With the throwing open of trade it was possible for an enterprising man to carry on commerce on any scale, to push his wares and generally increase his sales wherever he could without limitation of any kind. This amounted to a veritable revolution in commerce. Alongside of this opportunity

for expansion came the emigration of the Huguenots into England. Besides introducing many new industries such as silk, cotton printing, paper and linen, there was no branch of English trade which they did not improve with their taste and skill. Hence England had a more varied assortment of goods with which to push her trade. Moreover the Huguenots preserved their old business connections, and England inherited in this way a great deal of the French trade.

At the revolution of 1689 the control of economic affairs definitely passed to the House of Commons, and the Whig party became the arbiters of national policy. The Tories were inclined toward "free trade." They believed in favoring the consumer and in removing restrictions on intercourse, especially with France, the chief industrial rival of England. The Whigs on the other hand held very decidedly to a policy of encouraging industry and in so manipulating commerce that it should react on the prosperity of industry. Hence they devised a system of bounties for encouraging the exportation of silk, linen and corn. Bounties were also given to the fishing trades. They tried to stop the growth of competing industries in both Ireland and the colonies, and when Scotland showed signs of becoming a rival the Union was brought about.

In their fiscal policy and in their trade treaties the same Whig ideas were carried out. We first see them applied in the commercial relations between England and France. England's great industrial competitor at the end of the 17th century was France. Colbert had been doing everything in his power to encourage French industry and had gone so far, in 1667, as to put prohibitory rates on English cloth. Englishwomen with (to the masculine mind) an extraordinary perverseness would insist on wearing French goods when they could get them. Hence, according to the opinion of the day, to shut out French goods was to assist English industry in the best possible way. To this the Tories were opposed, but the Whigs were successful, in 1678, in carrying an Act prohibiting trade and commerce with France. A system of high duties was substituted for prohibition under James II., but the Whigs returned to the earlier policy. In 1713 a clause was added to the Treaty of Utrecht to the effect that England should admit French goods as in 1664. This gave rise to a tremendous controversy. Again the Whigs were successful; the commercial clauses of the treaty were not carried out, and the policy of protecting English industry by cutting off trade with France was not reversed till the treaty concluded by Pitt in 1786. By that time England no longer feared French competition and English manufactures were so much sought after in France that there was a tremendous outcry on the part of French manufacturers.

The Whig desire to shut out competitors extended to another department of commerce, namely, the trade with India. The East India Company had been bringing back silks and muslin and cotton goods which were worn by the "greatest gallants" as well as by "the meanest cook maids" instead of good English cloth. Hence employment was being diverted from Englishmen to Hindoos, and in 1700 an Act

was passed by which East India goods might be warehoused for re-exportation, but they might not be sold within the country.

But it was not enough to shut out possible competitors. Definite encouragements to English trade were given by the Methuen Treaty negotiated with Portugal in 1703, and by the Asiento Contract obtained from Spain in 1713. The Portuguese had prohibited the importation of English cloth, and in 1703 Mr. Methuen was successful in getting this prohibition removed on condition that Portuguese wines were admitted into England at two-thirds of the duty on French wines. The trade with Portugal thus opened up was reckoned to be a very large one, and was especially cherished since a large part of the returns was paid in Brazilian bullion, with which we could renew our depreciated coinage.

By the Asiento Treaty the Whigs got a large part of the slave trade with Spanish America into their hands. They obtained the right to import 4,800 negroes annually and to send one vessel of 500 tons to import goods into the Spanish colonies. The West Indies became a great depôt for this trade and under the cover of the one ship the English got possession of much of the Spanish-American trade. From every point of view the slave trade commended itself to the general opinion of the time. It encouraged shipping, promoted trade with Africa—which country took English cloth in payment for slaves—it supplied labor to the West Indies and Virginia and helped the agricultural development of the colonies. Moreover the slaves were a means of carrying on trade with Spanish-America. But from the English point of view the economic effects were still more important. As long as the colonies had slaves they would never take to manufacture, the negro being incapable of the necessary training. The colonies would continue therefore to grow the tropical commodities for England to distribute.

Sir Robert Walpole began to reform the fiscal system with the same object of stimulating industry through commerce. Accordingly he overhauled the book of rates between 1721-4 with the object, to use his own words, of making "the exportation of our own manufactures and the importation of the commodities used in the manufacturing of them as practical and easy as may be." He repealed or reduced the import duties on raw materials and arranged for manufactured exports to be duty free. He next began to try and stimulate the warehousing trade which the Navigation Acts (see GREAT BRITAIN — NAVIGATION ACTS) were partly designed to create. He hoped to make England "one general free port and a magazine and common storehouse for all nations."

This system of deliberately building up English industry was continued until the time of the younger Pitt, who, following out the Tory tradition of free intercourse, not merely reopened trade with France but tried to carry free trade between England and Ireland, unsuccessfully however, owing to the hostility of the English manufacturers. He also wished to allow American ships to trade freely with England and the West Indies in spite of the Navigation Acts. But this Tory reversal of the Whig policy was doomed to failure.

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The French wars prevented any relaxation of the system for revenue reasons, and it was not until 1822 that the great breach with the Whig policy of the 18th century was definitely made.

During the 18th century English commerce steadily increased in almost every direction, especially with the colonies. In 1699 the exports had been estimated at £7,302,716. By 1720 they were £8,681,200 and by 1740, £11,469,872. In 1760 the figure had reached £15,579,073; in 1771, £17,161,146; while with machine products the total reached £34,381,617, in 1800.

The imports in 1699 were £3,482,586; by 1720 they had nearly doubled, being £6,090,083. In 1760 they were £9,832,802; and in 1771 had reached £12,821,995. In 1800 they were £28,257,781.

It is exceedingly difficult to say whether this increase was a result of the Whig policy or no, but the fact remains that while they held the reins of power English trade extended as they intended it should, and thus prepared the way for the introduction of machinery. It was no accident that the industrial revolution (see GREAT BRITAIN — INDUSTRIAL REVOLUTION) occurred in England when it did. At the Restoration English industry was very backward; English agriculture undeveloped; and English commerce small. By the end of the 18th century England, in spite of the loss of her American colonies, was the greatest trading country in the world. Her goods, through sheer cheapness, were forcing their way into every country. She was the great carrier of the world, and the only people that could compete with her were the Americans, whose shipping had grown up under English protection. She was able to withstand, by her wealth, the great financial strain of the French wars, and to control the access of colonial produce to Europe.

That many mistakes were made is no doubt true, and Adam Smith did not hesitate to expose them; but the objects which the Whigs had at heart were attained to an extraordinary degree during their tenure of power.

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19 (b). Great Britain—Commerce. *Volume of Trade.*—It has been estimated that nearly a fifth of the working population of the United Kingdom depends for existence on the sale of its products in foreign markets; add to this the classes engaged in ocean transport, in market organization and financial settlements, and it is possible to arrive at some conception of the magnitude of the interests involved and

the importance assigned in the United Kingdom to overseas commerce. Parliament and the Press never tire of the theme. Not merely the Board of Trade, but all other great departments of administration, whether concerned with defence, revenue, foreign and colonial affairs, or education, find themselves involved in one way or another in the consideration of the interest of international commerce. So far, indeed, has been carried this exclusive attention to external relations, that the existence of a home market is not seldom forgotten or ignored. Some ground for this forgetfulness may be found in the great value of the foreign trade—over £920,000,000 sterling in 1904—in relation to a limited population and area; but its real importance in the economy of the United Kingdom appears only on a further analysis of the figures.

Of the imports, valued at £551,000,000, three-fourths must be credited to food and raw material, the rest to manufactures of various kinds. The exports are made up of £300,000,000 of British produce and £70,000,000 foreign and colonial re-exports. Manufactures constitute the mass of British produce exported, with one important exception—coal. The figures imply much that is interesting both in past history and present organization. A country of restricted area and resources obtained, through various economic and political accidents, a start in the industrial race a century ago. Some of the necessary raw materials of industry it cannot produce, of others the quantity is insufficient for its growing demands. Increasing specialization leads to greater dependence on certain types of foreign imports and greater need for a market abroad for the constantly increasing surplus of manufactures. Food, too, must be brought from more favored regions, and the very success of manufactures breeds a natural tendency to neglect the interest of agriculture; though native resources, utilized to the utmost, would still be insufficient, in the present state of agricultural science, for the needs of the growing industrial population. The basis of the present system, and the only home product, on a large scale, which is more than sufficient for the needs of the moment, is coal. Hence it is exported from those districts where it is not utilized in local industries, and where access to the sea is easy; its ultimate functions being to provide power for British and foreign shipping or for foreign factories.

The entrepôt business, in foreign and colonial produce, again represents a historical advantage. It is a relic of the partial monopoly of the carrying trade, and the control of the supply of tropical, eastern, and colonial commodities to continental markets, long enjoyed by the United Kingdom. Though aided by the principle of inertia, and the facilities of old-established commercial centres, such business has not increased at a rate proportional to the general movement of trade; in fact, for a long period it was stationary at about £60,000,000, though recent years have witnessed a great improvement. This slow rate of growth is due mainly to the development of continental shipping and the establishment of direct relations between the European consumer and distant markets, which have been conspicuous features

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in the elaboration of international commerce during the last generation.

The last point noteworthy in the general figures, is the vast difference between the value of imports and exports. Apart from minor questions of statistical method, the excess of imports represents two main facts: firstly, returns for the service of some 9,000,000 tons of foreign-going shipping, which carries nearly the whole trade of the United Kingdom and no inconsiderable portion of that of the rest of the world; secondly, payments of interest by debtor nations and foreign industries to the great creditor nation of the 19th century, or in some cases, perhaps, the redemption or creation of capital liabilities.

Classification and Distribution of Imports.—The close relationship between foreign commerce and internal organization is best seen by tracing commodities from their sources or following them to their destination within the country. For this purpose much of the United Kingdom can be removed from the map. A small fragment of Scotland, a single port in Ireland, the north and part of the midland and west of England, with London and its subsidiary ports, cover the whole region of industrial and commercial importance. London, including the minor ports from Harwich to Southampton, receives about 40 per cent of the total imports of the United Kingdom. Of this vast trade, food, in one shape or another, accounts for nearly half; fruit, eggs, vegetables, butter and other minor agricultural products, with large supplies of beet sugar, from the neighboring districts of Europe; grain and meat from more distant countries; tea, coffee, rice, and miscellaneous tropical and sub-tropical products; all are poured in to supply the needs of the dense population of the London area, or to be distributed over the lines of communication radiating northward and westward.

Apart from food, the most important items of note in the statistics of London and its subsidiary ports are the silk, woollens and other textiles consigned from France and other parts of the continent which are valued at over £25,000,000 sterling. In this matter, London appears as the great consumer of luxuries; on the other hand the receipt of raw wool from distant parts of the world to the value of some £17,000,000, and of large quantities of tin from the East, shows her as a controller of markets and distributor of commodities which she does not utilize herself. For the rest, the trade is made up of innumerable minor manufactured articles, chiefly from European countries, and of miscellaneous raw materials from every region of the world, partly for use in the many industries of the London area, partly attracted thither by facilities of transport and marketing.

The only group to compare with London consists of Liverpool, with the Mersey ports, now including Manchester. Together they take another 30 per cent of the total imports of the kingdom. Roughly, a third is staple food stuffs, mainly from across the Atlantic; Liverpool vying with London as a distributor of these commodities; another third is raw cotton, nearly the whole of the supply needed for native industries; while in the miscellaneous group, the cane sugar and tobacco of the Indies, the palm-oil, nuts and rubber of the African and American

tropics are interesting reminders of the intimate connection of Liverpool with the older colonial and plantation trade.

The remainder of the import business is divided between the eastern group of seaports, represented by the Forth, the Tyne with Middlesboro, and the Humber; and the western, represented by the Clyde, the Severn and Belfast. The main intercourse of the east coast is naturally with the continent of Europe, from the Baltic to the Black Sea; and, for the most part, it can be regarded as merely an extension of London for the receipt of continental goods. One commodity alone deserves special remark. Iron, in various elementary stages of manufacture, enters the Humber from abroad, while Middlesboro and the Tyne find it necessary to import more and more foreign iron ore for their smelting industries. The native supplies, for certain purposes, show a distinct and unpleasant tendency to run short. On the west coast, the Clyde and Severn, like Liverpool, need food for the population concentrated on their coal areas, and have a small share in the sugar and tobacco of the plantation trade. Glasgow must look abroad for iron ore, Cardiff and South Wales for iron, copper, and tin, while Belfast needs flax and linen yarn to supplement native supplies.

All ports alike, from London downward, absorb vast quantities of timber in various shapes. The native supply is a thing of the past; so northern Europe, North America and the tropics are called in to provide this necessary material for railways and mining, and above all for one of the greatest home industries,—building—an industry which does not figure in the export list but is none the less of vital importance in the general economy of the country. An annual timber bill of £25,000,000 is a fairly prominent item in the national balance sheet. For food, raw materials, luxuries, for nearly all the needs of civilized existence, the United Kingdom depends partly or wholly on supplies from beyond the seas; it is small matter for surprise that the question of safety of trade routes, on the one hand, and of the economic and political policy of the regions from which the necessary supplies are drawn, on the other, should loom larger and larger in the view of statesmen, as the economic dependence of the country steadily increases.

Classification and Distribution of Exports.—As an outlet for those districts which produce the chief British staples, London cannot compare with Liverpool. Over a third of the total exports of British produce goes by way of the Mersey, only about a quarter by way of the London group. At Liverpool, cotton goods provide half the export, then come iron and steel in all stages of manufacture, large quantities of woollens, with textile machinery, chemicals and earthenware. In fact the main industries of Lancashire, Yorkshire, Cheshire, and the Midlands are here represented roughly in order of their relative importance. With one or two qualifications, the foreign trade of Liverpool may be taken as a type of that of the whole Kingdom.

The export business of the London group is less easy to define, partly owing to the many minor industries of London and district, partly

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owing to the modifying effects of cost of transport from the great producing centres. Textiles still hold the first place in the customs list, but large quantities of leather, millinery and apparel, paper and stationery, provisions, confectionery, pickles, and medicines, suggest rather the minor activities of a great centre of population than the staple industries of modern life. In short, London may be regarded rather as a general store, handling every kind of goods and forwarding to all parts. The main activities are typical of commercial rather than industrial England.

The export trade of the east coast has certain peculiarities worth a moment's attention. Many million tons of coal leave the Tyne and Humber for European ports, while the textile industries are represented by yarns and machinery rather than finished goods. A certain amount of iron and steel, with ships and their machinery, completes the main features of the trade. The European markets, owing to their advance in industrial organization, tend to be accessible only to certain restricted groups of British industries; the changing conditions are reflected in the customs records of the eastern seaports.

On the west coast, a few million pounds worth of cotton, iron and steel, ships and machinery represents the industrial activity of the Glasgow district; while the linens of Belfast, the iron, steel, and tin plate of the Severn ports and £10,000,000 worth of steam coal from Cardiff complete the schedule of the chief British exports.

In the entrepôt business, London and Liverpool alone are worthy of notice. London is still the chief European market for wool, though her position has been affected by the increase of direct relations between Australia and the continent. But the supreme control of the world's tea trade has dropped from her grasp. The teas of China, whether destined for Europe or America, no longer fill her warehouses. In this, as in other less important departments of commerce, the development of commercial policy of the Powers in the Far East and more particularly the activity of their shipping, have gradually undermined those special advantages on which the great entrepôt trade was founded. London still remains a convenient market for miscellaneous tropical and colonial products, and this position she shares with Liverpool. Broadly speaking, the one looks to the east for imports, the other to the west; together they provide a collecting centre for minor commodities of the whole world. So long as British trade and shipping exist on their present scale, and London maintains its reputation in the financial transactions of commerce, this type of commission business is likely to persist, though it may represent a decreasing proportion of the total commercial activity of the country.

Changes in Character and Sources of Imports.

—The ultimate destination of exports or the origin of imports may be a matter of indifference to the individual trader; but in a review of the whole movement of commerce, the question of sources of supply and markets for products, is of the highest interest. In recent years there have been great changes both in the

distribution of British manufactures exported and in the sources of the national food supply. Raw materials for the great industries have been affected to a less degree. A generation ago, Europe vied with North America as an exporter of wheat and flour to the United Kingdom; at the close of the century her share had fallen from over 40 to less than 10 per cent. North America had annexed the trade, the larger share falling to the United States, though Canada was rapidly improving her position. India, the Argentine Republic, and Australasia merely supplemented the deficiencies of this supply. But the situation has changed radically, in the last three years, through the enormous deficiency in the supply from the United States, coupled with a corresponding rise in that from India, the Argentine and eastern Europe. Moreover, there are elements of permanence in the change. Apart from the fact that the United States may have considerably less to spare, in the near future, after the satisfaction of the needs of her own industrial population, there are evident economic advantages involved in the purchase of food supplies from those regions which, in their turn, provide an equivalent market for British manufactures. The imports of live cattle from Europe have also ceased, while a new trade in fresh meat with the most distant regions has been created under modern conditions of transport.

In spite of these changes, there has not been that decrease in west-European imports into the United Kingdom which might have been anticipated. Though staple foods for export are only available on a large scale in the non-industrial eastern districts of Europe, the neighboring countries of the west still supply, for British consumption, large quantities of the minor perishable food products. Superior organization and better facilities for transport enable the small grower abroad to supply the great consuming centres with much that could readily be produced in agricultural England. Compensation has also been provided by the enormous growth in the import of beet-sugar, stimulated by the bounty system—a growth of many hundred per cent in twenty years. Since the abolition of the bounties by the convention which came into force in 1903 there has been a considerable decrease in the supply of beet-sugar from Europe, with an increase in that of cane-sugar from tropical regions; but it is impossible to forecast the ultimate position of equilibrium. Further compensation is to be found in the increasing volume of the stream of those continental manufactures which find a ready market in the United Kingdom. The net import of foreign manufactured goods, more than half of which are ready for consumption, has doubled in the last generation and is now valued at upwards of £130,000,000 sterling annually. The greater part of this must be credited to the industrial regions of western Europe. Formerly one of the best markets for the British manufacturer, they are now reversing to some extent the earlier movement, and invade with success the British market, either supplementing or competing with the native industries.

In raw material the changes are less conspicuous. American cotton and Australian wool still dominate the market; but the tin for British industries is now largely imported from

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Malaya and Australia, while even for iron ore it is found necessary to utilize more and more the Spanish, Scandinavian and other foreign supplies. The import trade in raw material and food has one characteristic common to all its branches, that is the vastly increased distance from which commodities can be gathered and to some extent the multiplication of possible alternative sources. In fact, the need of an alternative, particularly when no native supply is available, has so impressed itself, not merely on the individual importer but on the great manufacturing interests as a whole and on many responsible officials and politicians, that it bids fair to give rise to a new type of commercial policy, in defence of the national economic interests.

Foreign Markets.—The question of a foreign market for British manufactures raises more difficulties than that of the source of imports. As a general rule, the supply of the latter can be safely left to the foreign countries interested in their production; but British exports must seek out their market in the face of the world-wide competition. In this connection it is worth noting that the proportion of manufactures in the total exports of British produce to the chief protected foreign countries, fell in the last twenty years of the 19th century from 85 to 72 per cent. In the same period the total export of coal more than trebled, while the number of the population engaged in mining shows a heavy relative and absolute increase. These two facts, taken together, are not without significance; though a proportion of the coal exported is accounted for by the enormous increase in the tonnage of British steam shipping engaged in the trade of the world.

Apart altogether from the effects of fiscal policy, the development of the industrial activities of western Europe and the United States has necessarily narrowed the market for British manufactured staples. Both regions take a smaller proportionate share of British exports, while in the case of the United States there has been a heavy absolute fall, for which woollens and tinplate are largely responsible. The European trade has maintained its value and in some cases has shown a tendency to increase; but the type seems to be changing steadily; coal, yarn, and machinery for continental industries tend more and more to take the place of finished goods. The census returns provide a valuable comment on the statistics of exports. Among the greater industries, iron and steel and their manufactures alone show an increase in the proportion of the population employed, comparable to that in mining. Woollens and other textiles show a large decrease. Cotton shows a slight increase in the total number but not commensurate with the growth of population. But allowance must be made for more efficient machinery and labor; while the activity of Lancashire during the last two years, as evidenced by the building of new mills and the greatly increased import of raw cotton and export of finished goods, suggests that the next census will tell a very different tale.

The cry for new markets and the "open door" is not without good foundation. In the west, the United States has evident advantages; Germany, owing to her position and her land

frontiers, is exceptionally favored for intercourse with the purely agricultural regions of Europe; while, in the Far East, Japan has started on an industrial career which compels her to import food and raw material rather than finished products. There remain as open markets China, nearer Asia, South America, and the British colonial possessions. The fact that staple British exports have found a rapidly expanding market in the self-governing colonies has masked the decline in other directions. How long the expansion will continue it is impossible to say; the colonies are not without their own individual aspirations, but it is likely to be long before their manufacturing capacity overtakes the demand of their vast agricultural populations.

The British exporter has to face a steady contraction of the world-markets freely open to him, with increased competition in these markets from regions formerly his customers, now self-supporting and rivals in his own line of business. He may change gradually the character of the products exported, though always within the limits set by the national resources of the country; he may find better outlets for miscellaneous articles than for the great staples, but export he must unless the whole economic system is to collapse. He is affected, not merely by the economic policy of foreign states, but by the rise of conditions in the world-market for manufactures, which were scarcely contemplated a generation ago; these conditions may concern more vitally a highly specialized industrial country than one which, either by policy or by natural advantage, is enabled to maintain a better balance of its productive energies and a larger independence of foreign supplies.

Hitherto the British producer and merchant have risen superior to difficulties; ground lost in one direction has been gained in another, while competition has served as a stimulus to greater exertion, and in spite of fluctuations and temporary depressions, the volume of British trade has steadily increased; and this fact gives strong support to the view that the energy and adaptability of the United Kingdom, alike in the spheres of industry and commerce, are as yet far from reaching a limit.

The following statistical tables give a general view of the progress of British trade for 10 years.

VALUE OF IMPORTS AND EXPORTS OF THE MERCHANDISE OF THE UNITED KINGDOM.*

YEAR.	Total imports.	Exports of British produce.	Exports of foreign and colonial produce.	Total imports and exports.
	£	£	£	£
1901	521,990,198	280,022,376	67,841,802	869,854,466
1902	528,391,274	283,423,966	65,814,813	877,630,053
1903	542,600,280	290,800,108	69,573,564	902,973,951
1904	551,038,628	300,711,040	70,304,281	922,053,949
1905	565,019,917	329,816,614	77,779,943	972,616,444
1906	607,888,500	375,575,338	85,102,480	1,068,566,318
1907	645,807,942	426,035,083	91,942,084	1,163,785,109
1908	592,953,487	377,103,824	79,623,697	1,049,681,008
1909	624,704,957	378,180,347	91,344,819	1,094,230,123
1910	678,440,173	430,589,811	103,776,104	1,212,806,088

* The important difference between the system of the United Kingdom and other systems is that the former shows the values at the time of import and export, whilst in most other countries the prices are computed at the prices of a year or more before.

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AVERAGE SHARE PER HEAD OF POPULATION.

YEAR.	Imports.			Exports of British products.			Total imports and exports.		
	£	s.	d.	£	s.	d.	£	s.	d.
1901.....	12	11	3	6	14	9	20	18	8
1902.....	12	11	10	6	15	1	20	18	4
1903.....	12	16	1	6	17	3	21	6	3
1904.....	12	17	6	7	0	6	21	10	11
1905.....	13	1	5	7	12	7	22	10	1
1906.....	13	18	5	8	12	0	24	9	6
1907.....	14	12	11	9	13	13	26	7	10
1908.....	13	6	3	8	9	4	23	11	3
1909.....	13	17	7	8	10	4	24	6	4
1910.....	14	18	5	9	9	5	26	13	5

The principal imports on which customs duties are levied are beer and spruce, chicory, cocoa, coffee, dried fruits, motor spirits, spirits, sugar, tea, tobacco and wine—spirits, sugar, tobacco, tea, and wine yielding the bulk of the entire levies.

Bibliography—Volume of Trade.—The source of all ordinary information as to British trade is the 'Annual Statement of Trade with Foreign Countries and British Possessions', supplemented by the 'Annual Statement of Navigation and Shipping'. The chief defect in the series is that until 1904 the figures represented ports from and to which the goods are shipped, and not countries of origin or ultimate destination. In other words, British trade relations, particularly with certain European countries, are entirely misrepresented. A supplementary volume is now issued which attempts to get at the real facts of the case.

Exports and Imports, Distribution and Changes.—Much valuable information as to the historical growth of British trade can be gathered from the 'Report of the Royal Commission in Trade Depression' (1886), supplemented by Parliamentary papers C. 6394 (1891), C. 8211 (1896), and Cd. 1761 (1903), which bring down to date the statistical information as to British trade and production. The Parliamentary paper, 'Food Supplies Imported 1870-1902' (No. 179, 1903), gives in detail the changes in the sources of supplies in the period. The 'Report of the Royal Commission on Food Supply in Time of War' contains much miscellaneous information as to sources of imports, including raw materials. Consult also the Parliamentary paper Cd. 1199 'Memorandum on Comparative Statistics of Population, Industry and Commerce' (1902); Cd. 1761 'Memoranda and Statistical Tables on British and Foreign Trade and Industrial Conditions' (1903), and Cd. 2337 'Second Series of Memoranda', on the same subject, (1904).

These volumes contain a vast amount of miscellaneous information of the latest date on British trade in relation to industry and foreign competition. They are not without serious inaccuracies, but represent the best official information available. The statistics cover a long period of years.

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20 (a). Great Britain — Navigation Acts. In the 17th century the independence of the English nation as a nation had been secured.

Spain had been conquered at sea, and henceforth maritime power became more than ever the great national ideal. Comparatively safe from the dominance of a foreign power, and her internal resources in process of rapid development, all the conditions were present for England to expand beyond the seas and to attempt to secure for herself that pre-eminent position in the world's commerce hitherto held by Holland. England's dominating purpose during the 17th century was to build up her foreign commerce, to outlive the Dutch at every point, to constitute herself the great warehousing and distributing depôt of Europe and to induce the colonies to contribute to the power of the mother country by growing commodities for her to re-export. When Scotland or Ireland seemed likely to encroach on the colonial trade they were carefully excluded.

All through the changes of dynasty from Charles I. to the time of the Whig predominance the same idea holds good; and the instrument by which all this was to be effected was the series of Navigation Acts or Acts of Trade.

The Navigation Acts were no new thing in the 17th century. There was one as early as 1381 (5 R. II. St. I. c. 23). It forbade goods to be exported or imported by Englishmen except "in ships of the King's allegiance." This Act was inoperative, however, owing to the lack of English shipping, but the idea of the statute was never lost sight of. A similar Act was passed in 1463 (3 Ed. IV. c. 1) but was dropped after three years. Efforts were again made to enforce a monopoly for English ships under Henry VII. (I. H. VII. c. 8 and 4 H. VII. c. 10) and in 1540 the old laws were re-enacted, the freights defined, and inducements offered to aliens to use English ships. Elizabeth gave up the policy of confining English trade generally to English ships and by an Act of 1563 (5 Eliz. c. 5) merely reserved the coasting trade.

In the 17th century the Navigation Acts were revived. In the early part of the century they took the form of royal letters and proclamations, but in the latter part the policy was embodied in the statutes of 1651 and the series of Acts between 1661 and 1696.

From the 17th century till the final repeal of the Acts between 1822 and 1854, the policy of confining English and colonial trade to English ships was consistently pursued.

The novel feature of the 17th century Navigation Acts did not lie so much in their continuous enforcement as in their enlarged scope and their application to the colonial trade. The Dutch being the greatest traders of the time had got the bulk of the English colonial trade into their hands by making advances to the colonists on the security of future crops. These they duly received when grown and distributed from Amsterdam. This conduct the English regarded as directly contrary to the whole object of colonization, the general view at that time being that people should only leave the mother country in order to build up English trade and shipping elsewhere.

The feeling of jealousy with regard to the Scotch was almost as strong. It is true that they were not such formidable rivals, but they were said to sail cheaper than the English, and as they had close trade relations with the Dutch

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it was feared that the latter might get hold of the English trade through the Scotch.

"The Plantations are His Majesty's Indies" runs a report of the Commissioners of Customs (30 Oct. 1661) "without charge to him secured and supported by the English subjects who employ above 200 saile of good English ships every year, breed abundance of mariners and begin to grow commodities of great value and esteeme." Were the Scotch allowed to trade freely on the same footing as Englishmen it would "in one word overthrow the very essence and design of the Act of Navigation."

The jealousy of both the Dutch and the Scotch was keenly felt in the 17th century. As soon as the plantations showed signs of development measures were taken, primarily against the Dutch, in order to secure the growing trade for England.

In 1621 we get the first of a series of orders and letters sent out by the King to the Colonial Governors with the object of having all colonial goods brought to England and brought in English ships. In 1624 a proclamation ordered that no tobacco should be imported in foreign bottoms. In 1629 another proclamation re-enacted the old Navigation Laws as to English trade generally. In 1633 the question of the colonial trade was referred to a committee who reported strongly in favor of confining such trade to English ships, and an order was accordingly issued to this effect. In 1637 letters were sent out to the governors in America and the West Indies ordering them to "strictly and resolutely" forbid all trade and traffic with the Dutch.

During the civil war the Dutch seem to have got more and more of the trade of the English colonies into their hands, and it became necessary to revive the policy which had been pursued under Charles I. This was done in the Act of 1651. The commonwealth wished to do a popular thing by appealing to the English hatred of the Dutch, and they no doubt also intended to give the ship owners some compensation for the overwhelming misfortunes which the civil war had brought on them. The restrictions of the Act were not new, nor was it enforced any more effectively than previous Acts had been. Cromwell indeed did not believe in the policy, and so great was the danger to English shipping from the Spanish and Royalist privateers that the government were only too glad to see trade kept alive in neutral ships. In the colonies the statute seems to have been generally disregarded. In 1660 (12 C. II. c. 18) the Act of 1651 was re-enacted with certain additions. The Act of 1651 had declared that no goods "of the growth, production or manufacture of Asia, Africa or America" should be imported into England except in English or colonial ships. Goods from Europe might come either in English vessels or in the ships of the country which produced the goods. As Holland was not a producer she would be particularly affected by this provision. In the 1660 Act the various clauses were made more precise. Both the import trade and the export trade of the plantations were to be carried in ships, English built, English owned, and manned by a crew of whom three parts were English. By a later statute (14 C. II. c. 11) colonial shipping was put on the same footing

as English for all the purposes of the Navigation Acts. Goods from Europe were subject to the same restrictions as in the Act of 1651, *i. e.*, they might be imported either in English ships or in ships of the country of origin. No attempt was made to restrict the export of English goods to English ships except in so far as the plantation trade was concerned.

The policy of developing the warehousing trade through the Navigation Acts as outlined by Charles I. was again taken up by his son. A number of commodities — sugar, tobacco, cotton, wool, indigo, ginger, fustick and dyewoods — were "enumerated," and could only be exported from the colonies either to England or to another English colony. Rice and naval stores were added to the list in 1706, and copper and beaver skins in 1722.

The Act of 1663 (15 C. II. c. 7) further extended the policy of making England a great entrepôt by enacting that commodities of the growth or manufacture of Europe that were needed by the colonists should be shipped from England in English or colonial vessels.

Thus, according to the Navigation Acts, the bulk of colonial produce had to be brought to the mother country, and the colonists were bound to take their manufactures from her or through her.

It should be observed that by these Acts the Scotch were shut out from the plantation trade and were not even reckoned as English for the purpose of making up 2 crew (13 & 14 C. II. c. 11) until the Act of Union. They petitioned to be allowed to trade with the colonies, but a Commission reported strongly against it because such liberty would bring infinite loss to His Majesty's customs and "much prejudice" to the English.

As to Ireland, enumerated goods could be imported there, according to the Act of 1660, and it seemed as if an Irish warehousing system might have developed since food was so cheap that many ships engaged in the colonial trade went into Irish ports to victual. English jealousy of Ireland was, however, too strong for her to be allowed to encroach on a province which England regarded as the foundation of her prosperity. An Act was passed in 1670 (22 & 23 C. II. c. 26) by which the staple colonial commodities were henceforth brought to England only. In 1695 Ireland was prohibited from receiving even non-enumerated commodities as the Bristol merchants complained of the injury done to their trade.

After the Restoration, English shipping increased rapidly; but it is not easy to estimate the precise effect of the Acts in building up the maritime power of England. The English mercantile marine doubled between the Restoration and the Revolution and continued to grow all through the 18th century. Petty, writing in 1699 ('Political Arithmetic,' pp. 258-9), said that shipping had increased three or four fold in the last 40 years; and Child ('Discourse of Trade,' 1695), chronicles the great increase of "Wharfs and Keys" to accommodate the growing trade. It is exceedingly difficult to estimate the extent to which this increased prosperity was due to other factors as well as the Navigation Acts. The English had been pushing trade in all directions after 1660; Charles

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II. had concluded a series of trade treaties which gave great openings to English merchants; the banking system was developing with increased facilities for traders; the old system of a steady but restricted trade carried on by merchant companies was giving way to the new principles of pushing trade anywhere and by all means. All these things contributed to increase the demand for shipping. But without the Navigation Acts it might have been Dutch shipping that would have profited, since Holland carried at much cheaper rates than any other nation. At any rate the Acts did secure that the increase of trade should benefit national shipping, although in the Baltic trades the results were at first disastrous. The English had not sufficient shipping for the trade, hence they could not get timber, and accordingly English ship building was hampered. It indeed became necessary to relax the restrictions as far as Norway and Sweden were concerned for three years (7 & 8 W. III. c. 22) to get in naval stores.

The policy of the Acts was attacked as tending to increase prices and limit trade. But the answer always was "that this kingdom is an island the defence whereof hath always been our shipping and seamen," and that therefore "profit and power ought jointly to be considered," and Child, who thus anticipated Adam Smith in his doctrine that defence is more than opulence, added "I think none can deny that the Act of Navigation hath and doth occasion building and employing three times the number of ships and seamen that otherwise we should or would do." Decker in 1766 referred to it as "that most glorious bulwark of our trade." ('High Duties,' p. 21.) Lord Sheffield called it in 1783 "the guardian of the prosperity of Britain," and even Adam Smith says "National animosity at that particular time aimed at the very same object which the most deliberate wisdom would have recommended."

Thus contemporaries seem to have believed that the policy of the Navigation Acts was effecting its object and that it did actually build up the maritime power of Great Britain. To that policy Parliament held steadily till the end of the 18th century.

The result of the Acts on the colonial system is also a matter of dispute. They have been unjustly blamed as being the cause of much friction between the colonies and the mother country. Indeed they have been alleged to be one of the primary causes of the loss of the American colonies. It must, however, be remembered that the Acts were by no means strictly adhered to in the 17th century either in England or the colonies. Especially was this true in the case of New England where smuggling seems to have attained the dignity of a profession. In 1696 it accordingly became necessary to reorganize the Board of Trade, and Courts of Admiralty were established in the colonies to see to the more stringent enforcement of the law. A period of lax administration, however, began again with Walpole and lasted till the time of the Seven Years' War, when an attempt was once more made to stop evasions. After 1763 the Acts were to be worked so as to afford a revenue by which the colonies should contribute part of the cost of

their own defence. Before that year the Acts do not seem to have inflicted any great hardship on the colonists, and the commercial monopoly the statutes sought to enforce was scarcely resented. "Whenever the Act pressed hard many individuals indeed evaded it," was Burke's dictum, and this was certainly true as regards the trade between New England and the French West Indies and Newfoundland. The colonists obtained from those places the French manufactures which according to law they were bound to get from England, but no serious attempt seems to have been made previous to 1763 to stop this illegal trade.

Again, the bringing of the "enumerated" commodities to England involved no very great hardship. England was the natural market for those goods, she being best able to undertake the distributing business in Europe with her old established connections. Where the "enumerations" worked hardly they could be relaxed, as was done in the case of rice in 1730. Moreover, in return for the restrictions thus imposed bounties were given to the colonists on the production of naval stores and copper. The growth of tobacco was put down in England so as to give the colonists a monopoly of the market. Another compensation was afforded to the colonies in the great development of shipbuilding and the carrying trade due to the protection given by the Acts to colonial shipping. Massachusetts not merely sold ships in Europe, but in England itself. The causes of the loss of the larger part of the first English Empire do not lie in the trade policy of the Navigation Acts.

In the 18th century the Dutch were outdistanced and England at last attained the position at which she had aimed of being the great carrier of the world. There is, however, no evidence to prove that the Dutch were injured vitally by the English Navigation Acts. The English colonial trade even at the end of the 17th century was only a small trade in the aggregate, and could not have been any very great loss to Holland at the time. The ultimate loss to the Dutch was no doubt great, since they were shut out of a branch of commerce which was capable of great development. The Dutch decline did not begin till 75 years after the passing of the Act of 1651. It was the increase in the volume of English trade while the Dutch trade remained stationary that raised England to the predominant mercantile position.

Between 1796 and 1822 many minor relaxations of the Navigation Acts were placed upon the statute book. Between 1822 and 1826 England's policy was materially changed. Reciprocity in matters of navigation took the place of monopoly. This involved also an alteration in the relations between the colonies and the mother country. To retain for the mother country the bulk of the colonial trade a system of preferential duties was established within the Empire. Between 1849 and 1854 the restrictions on foreign shipping and the colonial trade which were embodied in the Navigation Acts were wholly swept away.

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20 (b). **Great Britain — British Shipping.** To an island people, and especially to a nation which has necessarily to import four-fifths of the wheat it consumes, and fully one-half of the total amount of its food from countries beyond the sea, a large and efficient mercantile marine is a vital need. To such a nation, from a national point of view, the shipping and shipbuilding trades must be the most important of all trades.

At the present time the shipping trade is not only the most necessary, but in point of magnitude, it is the greatest of British trades. It is impossible to state with precise accuracy its total volume in terms of money, but the Board of Trade, in the careful and cautious calculation they published in 1903 (Cd. 1761) estimated the earnings of British ships in international trades, for the carriage of cargo alone, at \$450,000,000 per annum. If to this sum be added the earnings of the passenger and mail services, and of the coasting vessels at home and abroad owned and controlled by British subjects, the total, in the opinion of those best qualified to judge of the question, cannot be less than \$550,000,000 — an amount greatly exceeding the entire product of the largest British manufacture, that of cotton, which is estimated at \$450,000,000, and is about equal to the total gross revenue of all the British railways. Deducting a small percentage for the port dues and charges of the ships in foreign ports, the whole of this sum is distributed among British industries. Unlike the cotton manufacturer who must pay away half his total receipts for his imported raw material, the British ship and her engines are built of British materials in British shipbuilding yards, the officers, engineers, and more than four-fifths of the sailors are British subjects; the vessel is repaired and provisioned in British ports, is coaled at home, and generally abroad with British coal, and insured by British underwriters. It will be seen that British shipping is emphatically a national industry. About one man in 36 of the population is directly employed in some capacity upon the sea, but those indirectly employed in the trades ancillary to, and created by, the shipping industry are many times greater.

The latest returns issued by the Board of Trade, those of 1904, give the total tonnage of the merchant vessels registered under the

British flag as 12,156,101 tons net register, of which 10,554,520 tons belonged to the United Kingdom, and 1,601,581 to the self-governing colonies and other British possessions. Of the British tonnage, 8,751,853 tons consisted of steamships, and 1,802,667 tons of sailing vessels, that is to say five-sixths of the tonnage of the shipping of the United Kingdom is that of steamships, while of the colonial tonnage 674,540 tons was that of steamships, and 926,941 tons that of sailing vessels; that is to say little more than two-fifths was that of steamers. It is impossible correctly to appreciate the value of these figures except by comparison with those relating to other nations, and here the disparity is so great between the magnitude of the shipping tonnage of Great Britain engaged in international trade, and that of any other country, it would appear the only useful comparison is that between the mercantile fleet of the United Kingdom and those of all other nations, of which record exists, put together. These nations are Germany, France, the United States, Russia, Norway, Sweden, Denmark, Holland, Belgium, Portugal, Spain, Italy, Austria, Greece, China, and Japan. The latest published returns for these countries give the tonnage of their combined ocean merchant shipping as 11,894,853, a figure slightly below that of the whole British Empire, but exceeding that of the United Kingdom taken alone by some 12 per cent. A mere statement of total tonnage, however, is an incomplete statement of relative commercial efficiency. The best authorities calculate three tons of sail as being equal to one ton of steam, the latter at the low speed of 10 knots per hour. Of the combined fleets of the other nations of the world, 7,502,156 tons is that of steamships, and 4,392,697 that of sailing vessels. Thus, while five-sixths of the tonnage of British shipping is that of steamers, more than one-third of that of other countries consists of sailing vessels. Further, an analysis of the character and speed of the relative fleets gives still further proof of the superiority of the British marine. A high shipping authority, the editor of the 'Shipping World' (of London), after long and careful research has made and published as accurate and impartial an estimate as it is possible to make of the comparative efficiency of the British and foreign mercantile fleets. Taking a 10-knot steamer as a unit, and adding and deducting from tonnage in proportion to the departure from this standard of speed, to obtain the potential carrying power, he finds that the potential carrying power of British shipping is represented by the figures 16,445,000 against 13,061,000 for that of all other countries combined; while, if steam tonnage alone is taken, the figures for potential efficiency for the United Kingdom, and all other countries taken together, are 15,834,000 and 11,555,000 respectively.

The progress and prospects of this great trade appear to be satisfactory from the British point of view. The last Board of Trade Return, that for 1904, shows an increase of 352,000 tons in the British register, or more than tenfold that of Germany, France, or Norway the nations which rank next in point of increase.

The British demand for new ships is entirely supplied by the shipbuilding establishments of

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the country, which in addition have built for other nations during the last 10 years an annual average of about 200,000 tons, exclusive of ships of war. The mercantile fleets of other nations also consist, to a considerable extent, of the vessels discarded and sold by the British ship-owners. The tonnage of the vessels so sold and transferred to the registers of other European nations has amounted to an annual average of 360,000 tons during the last 10 years.

To this remarkable concentration of a great trade, one of a specially international character, and one greatly desired by all, in the hands of one nation, many causes have contributed. History shows that it cannot be attributed to commanding geographical advantage in the position of the British Islands, nor to any supreme aptitude of the British people for the life of the sea, and for conducting the over-sea trade of the world. In the art and the science of ship-building the French have always been well to the front. In the Napoleonic wars Nelson's best ships were those he had captured of French build. In our own time the French have more than once given a lead in naval construction; the first armored ship was French; it was the French who introduced the water-tube boilers, and constructed the first submarines. The coasts of Normandy and Brittany have always furnished hardy and courageous sailors and fishermen, and yet to-day France stands low in the scale of mercantile maritime powers, notwithstanding the extravagant subsidies she pays to her shipbuilders and shipowners. America contests with Great Britain the honor of the successfully applying steam to navigation. Fulton's experimental boat in 1798 was four years earlier than Symington's *Clermont* on the Forth and Clyde canal. The *Savannah* in 1819 was the first vessel with auxiliary steam to cross the Atlantic. Both in the construction of sailing ships and in the improvement of the early marine engine America led. Yet her tonnage of ships Registered for Oversea (Foreign Trade) (1904) stands within 1,000 tons of the figure of 1840. The supremacy of the British mercantile marine, therefore, cannot be attributed to the possession of superior inventiveness or aptitude of the British men for the command of the sea. The phenomenon itself is a very modern phenomenon. "It may be assumed," says Mr. Cunningham, an authority on economic history, "that in the Middle Ages the shipping of the Italian Republics and the Hanse League excelled that of England." The chance of England did not come in fact until the discoveries of Columbus and Vasco di Gama opened the Western and Eastern Oceans to commerce, which, until that time, had been confined principally to the Mediterranean and other inland seas. In later times we find that Spain and Portugal, and afterward, Holland took the lead in the new ocean traffic, so much so that in 1603 Sir Walter Raleigh wrote, "The merchant ships of England are not to be compared with those of the Dutch." The English position, however, was improving, and in 1666 Sir Henry Petty estimated that the Dutch shipping tonnage amounted to 900,000 tons, English to 500,000, French to 100,000, Hamburg, Dantzic, Denmark, and Sweden to 250,000, and Spain, Portugal, and Italy to 250,000. At this time English

shipping was subject to the celebrated Navigation Act of Oliver Cromwell (1651), the principle of which, broadly speaking, was to confine foreign trade with European countries to the vessels of Great Britain or of the country with which the trade was carried on; and all trade with any of the more distant continents, or with any of the plantations of Great Britain, entirely to British ships. The Navigation Laws of other maritime nations were framed in a similar spirit on similar lines. In the international race all competitors were pretty equally privileged or handicapped. Although the whole system had become riddled with exceptions and exemptions and suspensions, due sometimes to necessity, and sometimes to reciprocal treaties, the principle of the legislation of Cromwell remained in force until the Navigation Acts were finally repealed in 1849. The great expansion of the trade of the world in the first half of the 19th century together with the improvement in the size, speed, and cost of building and operating the new steam fleets, had rendered it generally impossible to maintain the mediæval system of the old Navigation Laws, and although other nations did not, like Great Britain, emancipate themselves from these fetters at a stroke, they have found it impossible to maintain them, and the relics of the ancient system survive in the present day chiefly in the form of the reservation of their coasting trades by many, though not by all, the civilized nations of the world, certain restrictions on their colonial trades, and in addition to this, in the case of the United States, the restriction of the privilege of the American register, with its exclusive right to the coasting trade, to ships built in America of American materials. The mediæval system in its old barbarous form has universally passed away, and for more than half a century Great Britain has carried on her over-sea trade in the atmosphere of free competition.

In all the previous centuries she possessed no marked superiority as a shipowning and sea-faring community, and at the time of the Free Trade revolution she might only with some doubt be placed first among the mercantile maritime powers. She was then making no marked progress in comparison with other nations, and in some respects was declining. For example, although, after the great war in 1815, the shipping tonnage of the United States was not half that of the United Kingdom, in 1850 the American mercantile marine had grown to be very nearly equal to that of England in total tonnage, if coast and lake and river steamers be included, and greatly exceeded it in efficiency, for it included more than half a million tons of steam shipping against less than 200,000 tons of British shipping of the same class. Although the tonnage of all American ships registered for over-sea (foreign) trade was at that time only about one-third of that of Great Britain, it was superior in quality, and was increasing with greater rapidity. The Americans excelled in the speed, efficiency, and beauty of their sailing ships, and the celebrated "Baltimore Clippers" and "American Liners" almost monopolized the carrying trade between Great Britain and the United States. In the middle of the 19th century it may be said that Great Britain and

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the United States were worthy and well-matched rivals in the race for leadership upon the ocean.

It is an interesting question to ask what are the causes to which this modern phenomenon, the supremacy of Great Britain in the trades of building, manning, and operating ships, is to be attributed; and especially those which have led to the decline in the mercantile marine of the United States registered for foreign trade, almost to the point of extinction. It would be erroneous to attribute this commercial revolution to any one cause. The substitution of steam for sailing ships does not appear to have been of any particular advantage to Great Britain, for during the first 30 years of the existence of sea-going steamships America kept the lead in this class of shipping, and her engineers contributed largely to the earlier development of the marine engine. The later substitution of iron and steel for wood as the material for the construction of ships undoubtedly gave a great temporary advantage to England, which was at that time and remained for many years the largest and cheapest producing country of iron and steel, but it does not explain the fact that while the production of iron and steel in America now greatly exceeds that of the United Kingdom, this country has not been able to regain any considerable portion of the trade of building and operating ships for international commerce. Undoubtedly the American war had a disastrous temporary effect upon American shipping, shown by the decrease in the tonnage of ships registered for oversea trade from 2,546,237 tons in 1860 to 1,516,800 tons in 1870, but this does not explain the failure of the United States to recover this single trade in succeeding years; still less does it explain the continuous reduction of American tonnage to 898,768 tons in 1904. The principal explanation of this phenomenon is undoubtedly to be found in the opposite fiscal policies pursued by the two countries. It would not be proper in this place to enter into an argument as to the general results of the British policy of Free Trade, and the American policy of Protection upon the two countries, but it is a fact admitted alike by free-traders and protectionists, that the control of this particular trade of international shipowning and shipbuilding has been determined by their mercantile policy (see **GREAT BRITAIN — FREE TRADE**). The growth of the shipping supremacy of Great Britain, a supremacy becoming more marked each year, dates from the adoption of the policy of free imports in the years 1840-50, coupled with the abolition of the Navigation Laws in 1849. The process of the absorption of international shipping by British shipowners has undoubtedly been assisted by the protection policy of other nations. By restricting their importation of British material goods, the inexorable economic law which compels each trading nation to pay its debts and balance its international accounts, has rendered it more convenient for Great Britain to pay for her great imports of food and raw material to the nations which refused her cotton goods or her iron, in the form of shipping services, which form at the present time the largest of British exports. The result has been that while the total volume of British trade amounts to not more than one-seventh of the trade of the world, British ships

carry more than one-half of the trade of the world. The volume of purely foreign trade, that is of trade between foreign port and foreign port—trade which does not touch the ports of the United Kingdom, carried by British ships—largely exceeds that of the direct trade to and from British ports. In contrast, the gradual decline of the American trade is well set out in a statistical table prepared by Mr. Meikle, Secretary of the Seattle Chamber of Commerce, and published in the Report of the Merchant Marine Commission at Washington in 1905. It showed that in the year 1821 the percentage of the import and export trade of the United States carried in American bottoms was 88.7. This proportion, which remained fairly steady until 1850, had shrunk in 1860 to 72.5 per cent. From that year onward the decline became increasingly rapid until in 1900 the percentage carried in American bottoms was only 9.2; and at about this figure it remains to-day.

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21. Great Britain — Railways. *Comparisons and Contrasts Between the Railway Systems of Great Britain and the United States.*—"The plastic American instinct has introduced the wholesale principle into regions where the slower-witted nations of Europe have never thought of applying it. The factory life of England is new, and British manufacturers fully appreciate the economies to be effected by turning out pins by the million gross, cotton yarn by the million pounds, and steel rails by the tens of thousands of tons. But the Americans have applied the principle to businesses which have existed since the dawn of civilization. Their hotel-keeping is wholesale; their farming is wholesale; and, most of all, their transportation system is wholesale. The English farmer still looks upon the railway train as only a slightly magnified carrier's cart, and persists in sending his basket of eggs or his hamper of vegetables to market, as his grandfather did when George III. was king. The American farmer does his business in carloads."*

The writer, in a book written by him 15 years ago, after his first visit to the United States, pointed out in these words what seemed to him then, as it seems to him now, the essential differentia between English and American railroading, and suggested that the difference is not accidental and specific, but part of the generic difference between the two countries which naturally arises from their different historical and geographical position.

But there are other important differences between the railways of England and the United States. England is an island, and a small one; America is a great continent. The maximum possible haul within the British Isles is just

* "The Railways and the Traders." (London, 1891.)

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about as far as from New York to Chicago. In fact there is practically no traffic here requiring to be carried any such distance. If it did, it would probably go by water, for there is no place in Great Britain more than 80 miles from a sea port. Any thing over 100 miles is referred to in England as a long haul; in the United States the average haul of freight is 133 miles. The average passenger journey in the United States is 30 miles; in Great Britain it is probably—accurate statistics do not exist—about 10 miles.

Again, Great Britain is densely populated; the United States is the reverse. On one-thirtieth of the area of the United States, England has half as much population. Naturally, therefore, while the United States has fewer miles of railway per square mile of area, Great Britain has fewer miles per thousand of the population. Roughly, the United States has one mile of railway per 18 square miles of area; Great Britain, one mile for every six square miles. But in Great Britain there is a mile of line for every 2,000 of the population; in the United States a mile of line for every 400. The population of Great Britain, and therefore, its intercourse, per mile being so much greater, it is also natural that a mile of railway is a much more elaborate thing than in the United States. For every route mile in the United States there are one and one third miles of track, while in Great Britain there are well over two miles. In equipment the contrast is even greater. With only one-tenth of mileage of railway in the United States, Great Britain has half the number of locomotives, more passenger cars, and nearly as many freight cars.* Put another way, a mile of English railway represents an expenditure of almost as many pounds as a mile of American railway represents dollars; a mile of English line earns five dollars for every two dollars that an American mile earns.

It must not, however, be assumed that a mile of English railway does work as compared with a mile of American in the same ratio in which it earns revenue. How much work American railways do is known. In the year 1905 they carried over 22,000,000,000 passengers and 174,000,000,000 tons of freight one mile. The railways of the United Kingdom in the same period—according to the best estimate that, in the absence of precise statistics, it is possible to make—carried about 14,000,000,000 passengers, and 150,000,000,000 tons one mile. In other words the railways of the United States dealt with over 700,000,000 passengers, carrying them on the average 30 miles each. English railways dealt with double that number, but only carried them on the average of 10 miles each. In freight service the railways of the United States handled thrice the tonnage of English railways—1,300,000,000 against 450,000,000 tons, and carried it nearly four times as far—133 miles against an estimated 30 miles. The average mile of railway therefore in America carried in the year (in very round figures) 100,000 passengers and 800,000 tons of freight. For the United Kingdom the estimated figures

are 600,000 passengers, and 670,000 tons of freight. Less freight service but six times as intense a passenger service. It would be wearisome to pursue the statistical contrast further. We may sum it up by saying that, whereas in the United States the typical passenger travels for a considerable distance at pretty long intervals, in Great Britain the railway occupies in great measure the place of the street car of the United States, and is the means by which large sections of the population move daily to and from their work and whereas the typical freight consignment in the United States is a "straight" carload of produce carried for a long distance, the typical consignment in Great Britain is a single box, or bag, or bale, or other package of manufactured articles, carried from one town to another closely adjacent.

The service required of the railways by the public of the two countries being so entirely different, it is only natural that the method of performing it, and the charges made for it should show equally wide differences. In the United States the railways receive two cents per mile on the average for every passenger, and at this rate find passenger traffic barely profitable. In Great Britain the railways receive hardly, if at all, more than one cent a mile on the average. Yet they can make a handsome profit, spite of the fact that they give a much more frequent and a faster service, with accommodation certainly not inferior in comfort. The mainstay of railway prosperity in the United States is in the carriage of freight at a rate of, roughly, five miles for four cents. English companies' receipts average, it is estimated, not less than two cents for each mile. Yet the prevailing opinion of those best qualified to judge is that much of the freight traffic in Great Britain is unprofitable, while not a little is done at an actual loss—for the irony of fate has decreed that England, with freight rates undoubtedly on the average the highest in the world, shall also have certain rates undoubtedly the lowest. For instance, for eight cents the Great Eastern Railway Company will bring from any of its country stations, say between 50 and 130 miles off, and deliver to the consumer's door in London a box of farm or garden produce of a gross weight of 20 lbs. See AMERICAN RAILROADS; RAILWAY SYSTEMS OF THE UNITED STATES; RAILWAY CONSOLIDATION.

Similarity.—England and the United States are the only great countries where the railway system has been provided by practically unaided private enterprise, and still remains in the hands of practically independent private companies. In both countries the state has found it necessary to interfere at many points, and an interesting essay might be written comparing the methods of government control adopted in each. But here it can only be very briefly pointed out that in both countries the Anglo-Saxon tradition has prevailed, and such governmental control as exists has taken in the main a legislative and judicial form. Executive interference—which in France descends to the minutest details of every-day operation—is of relatively small importance. On the whole it is safe to say that English railways are and always have been more closely supervised by public authority than the railways of the United States. On paper it is true some States of the

*Of course in Great Britain the locomotives and cars are smaller and freight cars only one-third of the size of those of the United States. The comparison includes freight cars privately owned (believed to be not less than 500,000 in number) which are ignored in English official statistics.

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Union—Texas more particularly—appear to interfere more than does the English government. But the operation of the Constitution and the rival state and federal jurisdiction secure even for railway corporations in Texas a considerable degree of practical freedom, while there is no possibility of escape from the supreme and final authority of an English Act of Parliament.

Laws Governing the Railway Systems.—According to the English code of railway law, which took practically its present shape as long ago as 1845, no company can come into existence, no new line can be constructed, no new capital can be raised without the authority of a special Act of Parliament, which lays down with great detail the constitution of the company, the route of the line and its method of construction, the amount of the capital and the purposes to which it shall be applied. Maximum rates and fares for goods and passengers are also prescribed. The authorized railway cannot be opened for passenger traffic until an inspection by public authority has secured that every possible precaution for safety has been taken. Once opened, however, the operation of the company is in the main in its own hands. Not so, however, the commercial management. A special court, the Railway Commission, exists to watch over the observance of the law of undue preference. Its powers are, it is true, seldom invoked, but that is the best proof of their real efficacy. Further, the same tribunal has power to forbid the increase of any existing rate for goods, and does in fact refuse to permit any such increase unless under exceptional circumstances. See RAILWAY CONSOLIDATION: *England*.

Finances.—Regarded as financial investments, the relative position of English and American railway stocks has been completely inverted within recent years. Formerly English railways were the most popular investments for English capital. To-day they are quite out of favor. The stock of one leading company, quoted a few years ago at 230, has recently been sold at under 150, though the dividend has remained practically unchanged. In cases, and they are very numerous, where the dividend has fallen, the drop in the capital value has been even more marked. It would probably be safe to say that the market value of English railway securities has fallen by at least a thousand million dollars within the last decade. In the year 1900, for the first time on record, the average earnings of all English railway capital fell below $3\frac{1}{2}$ per cent. And this at a time when trade was booming, and when the valua-

tion of American railway capital was advancing by leaps and bounds. The explanation is simple enough. The cost of working has been steadily rising owing to the more exacting demands of the public, the increased cost of materials, and the higher wages and shorter hours of the railway employees. The operating ratio rose steadily from 52 per cent in 1889, to 63 per cent in 1901. Moreover, with net receipts stationary, the railway capital has grown with alarming rapidity. For, it has been the traditional policy of English railway companies to divide half year by half year the whole of its profits among the shareholders, and to charge all additions and improvements to capital. This has been done perfectly openly and deliberately. But it has proved to be short-sighted finance. For it has resulted in swelling capital accounts to a size on which the earnings of the line can hardly pay more than a very modest dividend. And, in this staid, old-fashioned country, no railway company can hope to wipe out its past and start afresh with a reorganized capital account, as did some of the greatest and most famous railroads of the United States after the financial collapse of 1893.

One other point of contact between England and the United States may be noted in conclusion. Between them they are responsible for the original invention of railways, and for every important improvement in railway methods and practice that has been introduced since. There are some students of railway history who, spite of the fact that the nations of continental Europe are more and more going over to state ownership of railways, believe that this is no accident, but rather a natural result of the Anglo-Saxon habit of leaving to private enterprise the utmost freedom which practical experience shows to be compatible with the welfare of the nation at large.

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THE PRODUCTION OF WEALTH.

22 (a). *Great Britain—The English Land Law. Sources and General Characteristics.*—The law of land, or "real estate" bears the traces of the different streams of influence that have made English history. It derives its main characteristics from the feudal organization of society but these characteristics have been superimposed on other systems, or combined with other elements, which may be of early Germanic, Celtic, or in some instances even of

Roman origin. Again, the land laws have been the subject of frequent legislation; in the usual English method, particular evils have from time to time been remedied without any logical recasting of the body of the law and without the removal of mere anomalies which could not rank as grievances. But the main principles of the law may still be called feudal.

The modern law may be compared to a chalk cliff in which are many fossils; a cliff

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pierced by works and tunnels for such useful purposes as railways or mines, but left, where modern necessities have not interfered, to the slow decomposing action of the elements. The chalk is the feudalized common law, the fossils are pre-feudal survivals, such as land of "copyhold" tenure, the works and tunnels are Parliamentary Statutes, and the elements are the forces of public opinion acting by judicial exposition and construction. Compared to the law as it was in the early years of the 19th century, the modern law of real property is simple, but if it be tested by any more severe standard it still retains many intricacies for which it is easier to find a historical than a logical explanation.

Land on feudal principles is the subject of tenure and not ownership. No man owns English land unless he be King of England. Land is always "held of" some one—either the King, or a tenant in some degree of the King. Land was thus originally looked on rather as the means of fulfilling a duty than as so much property, and for the comparatively simple conception of ownership was substituted the more subtle idea of "estates," i. e., parts of and interests in ownership. Some of these interests were not recognized in the Courts of Common Law but only in "Equity," i. e. the extraordinary jurisdiction of the Chancellor. In time the feudal idea of tenure ceased to express the real state of things, and a tenant in fee simple became and has for many centuries been an absolute owner. But the inherited complications remained and indeed grew, being constantly developed so as to evade and even counteract Parliamentary Statutes which landowners and the legal profession viewed with disfavor. In 1832 the English land law was a vast metaphysical system requiring and developing great acuteness of intellect among practitioners but utterly unintelligible to a layman.

The feudal theory of tenure gave to English land holding a certain social character which in many country districts has never been lost. To this day land in rural England is looked on less as a means of livelihood or source of income than as giving a certain social status to which rights and obligations are attached. Indeed it would be difficult even now to give a better definition according to received ideas of the English upper social class than to say that it consists of the owners of the country estates of England.

The legal position of the possessor of land may be considered in three main aspects: his relations to his predecessors and successors, including what may be called family law; his economic and social relations, including the law of landlord and tenant; and his relations to the community as a whole, including his liability to taxation and generally the rights and powers of the State.

Family Law; (1) Settled Land.—England is a country of large properties, and most large properties are, to use a legal phrase, "Settled Land." The meaning of this is that by the terms of some deed or will (called for this purpose "a settlement") the land is not at the disposition of a living person to sell, mortgage or give away; the apparent owner is only what is called a "tenant for life," and on his death the land will pass to some other person, generally his eldest son, if he has children, but if he

has not, then to some collateral relative, without any effort and without any power of interference on his part. A "settlement" of this kind may be looked on as a temporary and conventional "entail"; it originates in the voluntary act of some tenant in fee simple, and its duration is limited by law to the life or lives of some person or persons in being when the settlement is made and a further period of 21 years afterward. The practical effect of an ordinary English settlement is to preserve the land for two or even three generations to the eldest living male of the senior line as head of the family to the exclusion of females and younger sons. In most land-holding families as soon as the person who will succeed to the land not merely as a life tenant but with absolute power of disposition, is next in succession and is 21 years of age, he joins with the existing tenant for life—usually his own father—to resettle the land for another two generations. Thus one settlement succeeds another, and a tenant in fee simple is rarely, if ever, in possession. Provision is usually made for a widow of a tenant for life by giving her an annuity known as a "jointure," and younger children are given comparatively small sums of capital known as "portions" which are made charges on the estate. This practice of settlement is permitted but not enjoined by the law; it came into fashion about the middle of the 17th century. It is thought by some observers that the practice now (1906), shows some signs of being on the wane, but no direct evidence is available; certainly it still affects nearly all large properties, and therefore the greater part of English land. Its result has been to make each eldest son in turn the proprietor of one or more family estates, to prevent the dispersal of land into many hands, and to keep for the head of a family a social prestige and pre-eminence among both relations and neighbors. If there happens to be a peerage or baronetcy in the family, the land practically always goes with the title. In fact it is not uncommon even in cases where there is no title or honor in the family for the settlement to provide that any person succeeding who does not already bear the family name—e. g. a married daughter, or a daughter's son—shall take the name and armorial bearings of the author of the settlement on pain of exclusion from the property. Younger sons, on the other hand, after a boyhood spent on the family property are left with slender portions to make their own careers; thus in their case class distinctions tend to be obliterated; younger sons of the land-holding class may be found in almost every branch of activity, in the navy, the army, in orders in the Anglican Church, in commerce, and in the learned professions.

British colonial development owes much to the adventurous disposition fostered by the outdoor life and the economic necessities of the younger sons of the land-holding classes.

Formerly the main economic objection to the legal fetters imposed on land-holders by settlements, was that during a settlement the land was taken out of commerce as it had no proprietor who could sell. This difficulty has now been removed as the result of an important Act of Parliament (The Settled Land Act

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1882). Every English tenant for life may now (1906) be considered as a kind of plenipotentiary agent for the whole family, born and unborn. Subject to certain not onerous restrictions, he can sell or lease for long periods on the recognized terms as he pleases; indeed he can do almost anything which a prudent and honest owner would do, but always on the terms that the property or the proceeds of sale are kept to descend in due course of settlement. But the real fetters on an English tenant for life are not those which the law imposes, but the fetters of tradition and family sentiment which no legal power or ingenuity can remove.

(2) *Land not Settled*.—Apart from this liberty of terminable settlement the English law does not favor restrictions on the powers of a landholder. No entail can by English law be created which cannot be destroyed as soon as some person unborn at the date of its creation attains 21 years of age. In the 15th century English lawyers, more daring than their Scottish brethren, with public feeling behind them, went so far as in substance to defeat the provisions of a Statute of Edward I. (*De Donis Conditionalibus*, A.D. 1285), by which Parliament had sought to make entails perpetual. Where land is not settled, in the case of the death of a landholder without a will, the common law on feudal principles gives his land to his eldest son; pre-feudal customs are, however, not left entirely without witnesses; in parts of the county of Kent the older custom of equal division, known as gavel-kind, still prevails, and in a few ancient boroughs under the custom known as "Borough English" the youngest son alone succeeds. But cases of intestacy are not common among the wealthy classes.

Wills.—A tenant in fee simple has, contrary to feudal principles, been gradually empowered by successive Acts of Parliament, culminating in the year 1662, to dispose of his land by will after his death in the same absolute manner as during his life. He can disinherit totally or partially all or any of his children and can at his pleasure give the land to strangers or, since the year 1891, even to charity. But the charity as a rule is bound to sell the land and not retain it.

Landlord and Tenant. (1) *The Town*.—There is a sharp contrast between the land system in the towns and in the country. In and near towns the proportion of settled to unsettled land is probably smaller than in the country; but even in the case of settled land the tie between landlord and tenant is purely economic. A town landlord may often be of inferior social standing to his tenant; further, urban and suburban land is often owned by commercial companies formed for dealings in land. But both in town and country, England is a land of large properties and it is the exception to find that the actual occupier of land is, in the popular phrase, "his own landlord."

On all land in or near towns, building is usually done on the lease-hold system. By this system the land is let, usually to a builder, for a long period, from 80 to 99 years. The lessee contracts to build and keep his building in repair; to pay an annual "ground rent"; to discharge all taxes levied on the land, and in fact

to bear all possible burdens connected with it. At the end of the lease the land and the building on it revert to the successors of the original landlord. The long lease thus granted may usually be sold or mortgaged at the pleasure of the lessee, and the building itself is frequently sublet by the lessee as landlord to the actual occupant as tenant, who pays to the original lessee or his successor a full or "rack" rent for building and land together.

Until recent years the whole tendency of the law was to favor the landlord as against the tenant, and even now the law can hardly be said not to lean in the landlord's favor, particularly in allowing him the right of distress for rent. In the exercise of this right, contrary to the general principles of English law, a landlord whose rent is in arrear can without the judgment of any Court seize and sell any chattels of any person, whether his tenant or a stranger, that he can find on the premises, and thus pay himself his rent. Recent legislation (*The Conveyancing and Law of Property Act 1881*) has, however, interfered against the landlord, who, whatever the terms of the lease, can now no longer forfeit a lease for a casual breach of covenant not deliberately persisted in by the tenant.

This leasehold system in and near towns, though frequent, is not by any means universal, especially in the north of England; there, a common plan is to sell land for building purposes out and out, in consideration of a perpetual rent reserved to the vendor. Further, the simple plan of the sale of building plots for a lump sum is probably growing in favor, particularly in suburban districts developed by land companies. A company of this kind has no family pride in the preservation of its estate, nor does it wish to realize an improved value after three generations.

(2) *Country*.—In the country districts the long leasehold system is unknown. The ordinary English farmer usually does not hold a lease for any fixed term of years, but has merely a tenancy from year to year determinable by 12 months' notice. As a rule all the farm buildings have been supplied by the landlord. The tendency of modern legislation is to give the agricultural tenant security for the value of his improvements, but the old law, which treats whatever is built or planted on land as an accretion to the land, and therefore the property of the landlord, still governs in the main the relationship of landlord and tenant.

The tie of landlord and tenant in the country districts is for good and for evil, not merely economic. The landlords are the social magistrates of the countryside. As unpaid magistrates they have had up till now (1906) practically a monopoly of the ordinary dispensation of all minor criminal and some civil justice. On the other hand, in bad years they are expected by the common opinion of the countryside to allow and do allow considerable reductions on the agreed rent. A "good landlord" is the man who is always ready to aid his tenants in sundry ways. On well-managed estates, the system works easily. The system, however, is one which for its success depends on the peculiar social conditions which have hitherto prevailed in rural England, and its transplantation to Ireland, where these condi-

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tions did not exist, had results disastrous for both countries.

Sporting Rights.—In England the love of sport has been a prominent characteristic of the landholding class throughout all history; it is practically the universal custom for a landlord to reserve the sporting rights over agricultural land. If he does not exercise them himself, he lets them to some other person. Where sporting rights are reserved the tenant has no right to kill pheasants or partridges, but the Ground Game Act of 1880 empowers the tenant himself, and one other person authorized by him in writing, to shoot hares and rabbits on his land whether sporting rights are reserved or not, and whatever the terms of the tenancy agreement.

Land and The State; Taxation.—The taxation of land is a question that is complicated by some historical anomalies. (1) **Land Tax.**—The burden commonly known as Land Tax represents historically the surviving portion of a general tax in the nature of an income tax imposed both on real and personal estate in the year 1692; but it has for many years been a mere stereotyped incumbrance redeemable by the landholder, and charged on the value of the land as in the year 1692. On most urban land the tax has been redeemed. (2) **Income Tax.**—Incomes derived from land, *i. e.* the net rent of land, are liable to income tax equally with incomes derived from other sources. (3) **Death Duties.**—Before 1894 land escaped the greater part of the death duties imposed on personal property, but since the Finance Act of that year all species of property are in this respect on an equality. (4) **Local Taxation.**—On the other hand a man's liability to local, as distinct from imperial, taxation is estimated by the value of the real property (*i. e.* land and buildings) which he occupies, no account (in spite of some earlier statutory provisions to the contrary) being taken of his personal property. On agricultural land, by an Act of Parliament passed in 1896, only half the ordinary rate is paid. But no contribution is made to local taxation in respect of the capital value of land, or of land which is not occupied, however high may be its value.

Other Rights of the State.—The feudal principle of the ultimate ownership of the King has produced little or no effect in giving to the State which the King personifies, rights over English land. The modern State has practically no mineral rights. The precious metals, gold and silver, which for commercial purposes are practically not found in Great Britain, are in law Crown property and can only be worked under license from the Crown. But all other minerals belong to the tenant in fee simple of the soil who leases or works them for his own private benefit. The Crown lands in England are small in extent; ownership by local authorities is still in its infancy. There is no prairie land to grant to railway pioneers or new settlers. When land is wanted for the purpose of some undertaking of a public nature—such as a railway, waterworks, or the site of a post-office—it has, as a rule, to be purchased by the company, or authority concerned, under statutory machinery, by which the fair value of the land has to be paid, plus 10 per cent. compensation

for compulsory sale. In the year 1887 the principle of compulsory acquisition was, subject to many safeguards, extended to the acquisition by a local authority of land to be let in very small quantities, called allotments, to agricultural laborers or others for cultivation. The Irish Land Purchase Act of 1903 proceeded on the principle of a loan by the State to a tenant who wished to purchase his holding from his landlord, and agreed with him as to the price. It did not directly involve either public ownership or compulsory acquisition.

Transfer.—In recent years several attempts, culminating in the Land Transfer Act 1897, have been made to induce English landholders to abandon the present system of private transfer of land for a system based on a Land Registry. Under the present system whenever land is sold or mortgaged, it is necessary for the purchaser or mortgagee to satisfy himself as to the title by going into all dealings with the land for a period which may be as long as 40 years. This is an expensive process, but it has been endeared by centuries of experience to English landholders and lawyers. At the present time, a public Land Registry has been substituted for the old system only in London. The principle of the new system is to enter the name of the proprietor of (or rather the person entitled to sell) every piece of land on a register and to make land transferable by the person registered by means of a fresh entry on the registry, as if it were so much stock in the funds. The extension of this system to the rest of the country is a question of time; but in legal matters time moves slowly.

Trend of the Law.—Recent developments of the law have in nearly all cases tended to restrict the freedom of the individual in relation to land. Neither in town nor country are landlord and tenant allowed to make what bargain they choose; it is assumed that the economic inferiority of the tenant places him at too great a disadvantage for it to be possible for him to make a contract fair to himself, and so beneficial to the community. Men are no longer allowed to settle their land in such a way as to make it unsalable, and the community has asserted the right to dispossess the individual, not only for definite works of a public nature, but in order to provide its poorer members with an interest in the land. It has also compelled land owners in the Metropolis to abandon the old system of private conveyance and mortgage for a system which is in a sense public, as it is worked by public officials, and which may thus be regarded as a kind of reversion to the old method of public transfer. The same system will also in time form—what is badly wanted—a new and more accurate 'Domesday Book.' Finally, modern legislation has put an end to the former advantage of land in respect of taxation and so claimed a larger share in real property directly for the State. The simplification of the land laws may be said to be one aspect of this change; intricacy and subtlety of phrase and interpretation may be tolerated by a private owner as the price of the liberty of complicated dispositions and of secrecy, but these niceties are inconsistent with the uniformity which must accompany public control.

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22 (b). **Great Britain — The Eighteenth Century — Agriculture.** Between 1700 and 1815 English agriculture changed its whole character. England became a great corn exporting country and continued so up to 1773. Great agricultural improvements were carried through, stock breeding became scientific, waste land was broken up, large portions of the fens were drained, big farms with enterprising up-to-date farmers became the object of every landlord and the agricultural system which had come down from Anglo-Saxon days, and which still prevailed over large parts of England, was given up. English farming became intensive in character instead of mainly extensive. The social effects of the change involved the disappearance or degradation of the landowning peasantry or

yeoman class. On the other hand it was only by means of the great increase in agricultural produce that England was not starved into submission during the Napoleonic wars. The changes in agriculture of that century meant ultimately nothing more nor less than national independence.

One of the main objects of English policy had been for centuries the encouragement of agriculture. A sufficient food supply raised at home deprived the enemy of the power of cutting off supplies from abroad. Moreover agriculture was considered the best breeding ground of good soldiers. Corn also was an excellent commodity for ships to carry, and the encouragement of corn export formed part of the Navigation policy of the realm. The great attention bestowed by successive governments upon agriculture was the most original part of English policy. Her seamanship she copied from Holland, her industrial protection from France; but while every other country aimed at preventing the export of corn so as to have a sufficient food supply, England deliberately stimulated export believing that thereby farming would be best encouraged.

This policy reached its most complete expression in the Corn Bounty Act (1 Wm. and Mary, c.12) of 1689, by which, when the price of wheat was at or below 48 shillings (and proportionately for other grains) a bounty was given on export.

The result of this law was to attract capital into farming. Men who sunk money in improvements were assured of a price which should not fall below 48 shillings and under the stimulus of this certainty a great agricultural revolution began. There grew up gradually a class of capitalist farmers and "spirited landlords" who were willing to carry out experiments. The result was that by 1770 England not only produced food for a population that had doubled itself, but was the granary of Europe.

One of the great improvements of the 18th century was, for example, the manuring of land, by which Arthur Young calculated that three or four hundred thousand acres of waste were turned into gardens. A revolution in fodder was brought about by the introduction of turnips and clover, while careful attention to grass seeds resulted in good hay on which cattle could be kept in condition in winter. Previous to the introduction of winter roots the majority of the beasts had to be killed in the autumn and salted down, while the remainder declined in weight through sheer starvation. This annual loss was now averted and a supply of fresh meat secured all the year round.

It therefore became worth while to improve the breed of the animals themselves. Bakewell of Dishley and Coke of Holkham wrought a revolution in English life with their Leicester and Southdown sheep and Devon cattle. Animals were now raised primarily for food instead of for their wool or hides, they were ready for the market sooner and the average size of cattle doubled and trebled. Thus a larger food supply was secured, and the great stockbreeders wrought a change the effects of which were as far reaching as those of Watt and Arkwright.

Before however this scientific farming could

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become general it had to become known. Roads were undeveloped, people in one county could not know what was passing in another, there was no agricultural newspaper — no machinery to make this knowledge common property. Moreover with the inherent conservatism of the agricultural class it needs something more than mere knowledge to make a farmer change his ways.

The necessary diffusion of information was carried out largely by Arthur Young and the Board of Agriculture, while the stimulus of the great wars and the shortage in the food supply provided a powerful incentive for improvement by means of high prices. Moreover, the growth of the iron and coal trade had led to the cutting of canals, and internal communications of all kinds were improved. People could get about; great towns began to grow up, providing an ever increasing market for food stuffs. It therefore became more and more worth while to effect improvements, and scientific agriculture became a patriotic hobby. The King himself wrote articles for agricultural newspapers and the great agricultural meetings and cattle shows put a spirit of emulation into farmers.

The chief obstacle to betterment lay however in the fact that much of the land was owned by small farmers who simply had not the capital to get good stock, implements, seeds and manures. Moreover, the system of farming among the peasantry was that of farming in strips, each man having about thirty strips of land but no two lying together. These strips were separated from one another by turf balks, and after the hay and corn harvest had been gathered all the animals were turned indiscriminately over the open fields. The system was most wasteful. It was quite impossible to adopt improved methods of cultivation on half acre strips. No winter crops could be grown because the cattle ranged all over the fields from September to February. No improvements in breed could be carried out when good cattle were exposed to the infection of the mangy village herds with their foot and mouth disease. No drainage could be attempted since the out-fall would be on some neighbor's strip. The loss of time involved in going from piece to piece, and in carting little bits of hay and corn from different places, to say nothing of the waste of numerous footpaths and the endless disputes over real or fancied encroachments, made the system one which in the interest of good farming it was highly desirable to displace. It was established by the Board of Agriculture that tenants lived comfortably on enclosed land rented at 10/6 an acre who had starved on open farms at 2/6 an acre and that enclosed land at 20/- an acre was cheaper than open land at 8/-.

The famine years of 1795, 1800 and 1801 made the prosperity of agriculture a pressing national question. Enclosures were pushed on rapidly, partly by the agreement of the parties concerned, but mainly by private Acts of Parliament. The general result was that the scattered strips were given up and each farmer received an equivalent in a compact little holding all in one place.

Between 1770 and 1799, 1,375 enclosure bills were passed, between 1800 and 1819, 1,700.

Altogether it has been calculated that over 2,500,000 acres were affected by the Acts prior to 1801.

The result meant better farming, but it also involved great loss to the peasant and the laborer. The fees of the commissioners for re-distributing the lands, the legal expenses of getting a private Act, the cost of hedging the new farm, all bore hardly on the yeoman. Even when he had survived the actual enclosure he found it hopeless to compete with the capitalist farmer. The stuff he could raise would not bring a remunerative price in competition with that of the large producers. He was moreover hard hit by the loss of the bye employments of spinning and weaving which were tending to become more and more factory industries. Many of the yeomen sold their little farms to large landowners who were only too anxious to throw them together into big ones in order to realize the high prices during the war period. Moreover the new men who were making their money in cotton were glad to buy land for the sake of social position. With an increasing struggle for existence on the one hand and the prospect of a good sale on the other the small farmers sold their holdings and disappeared. Those that held on were so hard hit by the great depression in agriculture after 1815 that they too were forced to succumb. Hence England between 1770-1815 became predominantly the land of the capitalist farmer.

The laborers, too, suffered considerably, since when the land was enclosed they lost many little perquisites such as turning out a cow on the waste or gathering fuel. But more important than all was the fact that the laborer lost the chance of rising in the world. The small farmer had ceased practically to exist and the laborers never could hope to get together capital enough to take a big farm.

But without the improvements of those years England could not have held out against Napoleon. She would simply have surrendered from famine when the Baltic corn was cut off.

The stimulus of the Corn Bounty Act started the agricultural revolution, the great wars completed it. The result was an enormous advance in farming but great social distress; the extinction of the peasant proprietor, but the ultimate safety of England.

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22 (c). **Great Britain — Agriculture.** *History.*—The close of the 18th century saw the English system of farming fully established, with its characteristic division of the landed interest into the three classes of landlord capitalists, tenant farmers, and laborers. Agricultural improvement had indeed made great strides during the 18th century, and in some parts of the country, as in Norfolk and Herts, the change from the old open field system to large enclosed farms had already been accomplished, but it was the high prices for food, prevailing at a time when the rapid growth of a manufacturing population coincided with the Napoleonic wars, which finally swept away the village-community style of farming and replaced it by the large tenant holdings as known to-day. The old system, while it supported a good many poor men on the land, was a very inefficient method of feeding the nation. The first condition of agricultural improvement was the investment of capital in the land, and the most economical way of doing it has proved to be to allow the landlord to use his money on the permanent amelioration of his property, leaving the whole of the tenant's resources free to be employed in his business of farming. It should perhaps be explained that on an ordinary Scotch or English estate, the landlord bears the cost of all the work which may be supposed to permanently increase the letting value of the farm. He, for example, erects all the buildings required by the tenant, and supplies the latter with timber and other materials for their repair; he finds wood and gates for fencing, tiles for draining; in many cases he even provides the fruit trees that are to be planted, and the seed for land that is to be laid down in permanent grass. The advantage of this system lies in the fact that the tenant's capital is kept in a liquid condition; he becomes a manufacturer of meal and corn, who hires land and buildings as tools in his business, and how well it has succeeded may be learned by comparing the results attained by British farming with those of other countries. In Great Britain the average yield of wheat for the last ten years has been 32 bushels per acre, as against a world's average of about 12 bushels, a French average of 20, a United States average of 13; the only countries with a similar large yield being Germany and Belgium with 28 bushels per acre. A comparison of other crops would be even more favorable to Great Britain. The development of improved breeds of live stock and superior strains of crops, as will be recounted in a later section, has been made possible by the existence of a race of tenant farmers with both the means and the temperament to speculate in the development of their industry. The system has of course its drawbacks; it demands that the landlord should possess capital and some understanding of the agricultural situation; it lacks flexibility when a great economic change takes place like the fall in prices after 1876; it encourages too conservative a style of farming, for it checks the initiative of tenants by giving small security that they will reap the

benefit of any increase in the value of the farm due to their improvements. Its intense individuality, from which so much has been gained in the past, becomes a drawback now that the farmers of a country are no longer competing with one another, but have to be organized to maintain their position in the common market of the world.

The agricultural history of the 19th century in Great Britain may be divided into four epochs, beginning with the period of inflated war prices which lasted up to 1816, during which time the great work of enclosing the common lands and forming large farms was practically completed. This was also a period of great activity in the improvement of farming; the foundations of most of the British breeds of live stock were then laid; machinery began to be applied to agriculture, and the reclamation of the wastes, practically the creation of good arable soil out of barren sands and intractable clays, proceeded with vigor. The value of marl on the light sands, and of chalk and lime upon the clays had long been known, but at this time such ameliorations were being carried out wholesale and with a thoroughness of which the British farmer is still reaping the benefit. There followed a period of 20 years of unexampled depression when the great break in prices, consequent on the end of the war, was aggravated by a succession of bad seasons. Little by little this depression was removed as the obligations incurred during the time of inflation became void, as the weaker farmers and small holders became squeezed out, and particularly as the consuming population in the manufacturing towns grew in number and wealth. The forty years from 1836 to 1876 may be described as the Golden Age of British farming. The making of the soil by marling, claying, chalking, etc., went on apace; something like 3,000,000 acres were tile-drained in England alone between 1830 and 1870; simultaneously also science and the industries put at the service of the farmer nearly all the modern range of fertilizers and feeding stuffs—guano, nitrate of soda, phosphates, and the oil cakes. The modern breeds of live stock became clearly defined, and had their herd and flock books established during this period, and amongst the best practitioners farming became a fine art attaining the polish characteristic of a well-kept garden. Rents rose steadily with the competition for farms among not only the farming classes but also the tradespeople of the country towns, who saw in agriculture the road to wealth and an easy life; indeed, on the great estates where the tradition was against rack-renting the sound farmers were realizing very considerable fortunes.

The crowning period of this prosperity was the time of the Franco-German war of 1870-72. By 1875 the depression was beginning to make itself felt. Freights were low and foreign imports, especially American, of grain, wool, cheese and butter were beginning to grow rapidly. A run of bad harvests had also set in, culminating in the black year of 1879, when the lowest cereal

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yields on record, due to continuous wet weather, coincided with an enormous crop and corresponding importations from the United States. From this time the yield of corn in England ceased to rule its price, which has in the main been set in Chicago. The great change that then came over agriculture would have been less fatal had its permanent character been recognized earlier; as it was, on very many estates rents were not lowered rapidly enough, with the result that the old tenants were ruined and new ones could only be attracted by comparatively enormous reductions. Up till 1894 the gloom was unrelieved, the prices of corn and wool dropped year by year, although wages were rising, nor were there any new factors in sight which promised a change for the better.

It was the arable land farmers who suffered the most, particularly the cultivators of heavy land in the eastern counties and the midlands, where the land was expensive to work and only profitable when wheat and beans made a good price. This land gradually got laid down to grass; much of it went wholly out of cultivation for a time and was only reclaimed again as grass land by a new race of farmers who got it almost rent free. The western side of the country, which had always been in the main devoted to grazing and dairying and where rents had never been excessive, suffered comparatively little, nor did the highly farmed Lothians show the same fall in rents as the arable lands farther south. The change which came over the farming of the country may be seen in the acreage under wheat, which from 3,600,000 acres in 1874, fell to 2,500,000 acres in 1885, and 1,400,000 in 1904; at the same time the area under permanent grass increased about 4,000,000 acres.

Since 1894 the drop in prices has been arrested, and an upward turn has manifested itself for nearly all the products of the farmer, meat only excepted. At the same time, a new race of farmers has grown up, who have discovered methods and openings by which a living may still be made out of the land. But though the agricultural situation may now be said to be comparatively stable and even improving, it is still full of difficulties. The British farmer is now competing with every country that has any agricultural produce to sell; the British market is the one open market of the world, and the price of any commodity is fixed by whichever country has a great surplus crop in that year. The proximity of the town, while it creates a market for certain products, also increases the farmer's expenses; in the end the manufacturing industries set the standard of wages and draw off the energetic and the able among the laborers. At the same time the farmer has to conform to the urban standard of life; he has to pay for roads, sanitation, and education of a style unknown to his competitors in a primitive country. Again, as a capitalist, he expects a return for the money he has invested in his business, whereas his competitors are, in most cases, content if they extract a living out of their labor, without taking into account the capital they have accumulated on their small holdings. Even the proximity to

the great population, which ought to be the saving factor, is nullified by high internal railway rates, which compare unfavorably with the assisted freights of most competing countries.

During the period we have under review the British tenant farmer may be credited with two characteristic steps forward; the perfecting of a system of high farming and the fixing and improvement of a number of races of live stock. As regards the first matter — high farming — three contributing factors may be noticed. Owing to the changeable climate and the diversity of the soils the preparation of the land for crops has always required some nicety in management, and the British farmer in virtue of his long experience became something of an artist in the treatment of his soil. And though since prices have fallen some of his practices are no longer very remunerative, however desirable from the point of view of securing the "best" even if not the most paying crop, yet British farmers are still in the main more skilful than those in any other country, as far as the actual cultivation of the soil goes. Secondly, the British farmer early learnt the value of a good rotation of crops, which should not only provide something to sell, but which would also furnish a continual supply of food for his stock. Though turnips, clovers and other artificial grasses were well known in England before 1700, it was not until the 18th century was nearing its close that their employment had been organized into such rotations as we know to-day. The British farmer was also the first to appreciate the possibilities which artificial manures put at his disposal; and the early exportations of guano, nitrate of soda, bones, etc., were in the main to the United Kingdom: Liebig even denounced England in no measured terms for her greed and wastefulness in drawing bones from all other civilized countries, and then squandering the phosphoric acid thus obtained by letting her sewage run into the sea. With the more intensive farming, due to better cultivation and the addition of manures, came improvements in the varieties of seed sown, mode of progress taken up with great energy both by individuals and certain firms of seedsmen. Though the results are not so noteworthy as in the case of live stock, yet most of the heavier yielding varieties, both of corn and of green crops, are of British origin, *e. g.* the "Squarehead" wheats, the "Chevalier" type of barley, the "drumhead" cabbage, all of which are widely spread over the world. Progress in all these directions made British farming the general model up to 1870 or so, and how real the superiority was, may be judged from the table in which the yields per acre in Great

	YIELD PER ACRE, MEAN, 1901-05.			
	Wheat, Bush.	Barley, Bush.	Oats, Bush.	Potatoes, Tons.
Great Britain....	30.7	32.6	39.3	5.9
France	19.4	22.4	27.2	3.2
Germany	28.2	33.2	38.7	5.3
United States....	13.2	26.5	31.2	2.2

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Britain are compared with the corresponding figures for France, Germany and the United States. Had the same comparison been made twenty-five or thirty years earlier the superiority of the United Kingdom would have been still more manifest, for while it has been reducing expenses to meet the depression in prices, the other countries have been working up to its level.

Live Stock.—But the special excellence of the British farmer has been his success in improving and fixing certain breeds of live stock, which have now become the standard breeds all the world over. Up to the middle of the 18th century there were a number of types of cattle and sheep to be found in the different districts of the British Isles, as in any other old farming country; but these types were ill-defined and there was no common or conscious action toward fixing them in any desirable direction. Robert Bakewell, of Dishley (1725–1795), working on Leicester sheep and Longhorn cattle, first showed how a breed could be improved and fixed. Bakewell aimed at an animal which would mature earlier and would put on its increase in the most profitable places. Carrying a type in his mind, he selected a number of animals approximating to his ideal and bred only from them; then by a period of close inbreeding among such of the progeny as conformed to the type, he was able both to advance rapidly in the desired direction and also to eliminate a good deal of the tendency to fall back toward the old unimproved class of animal. At the same time it was found that this close inbreeding resulted in sires which had great power of stamping their character on their offspring, even when the dam is of a different or common strain. Thus Bakewell's Leicester sheep have been employed to give quality to almost all the other local races, and there are nowadays few breeds of sheep in existence who do not possess a strain of Leicester blood in them. Bakewell's Longhorns have not had a like success, but the same principles were applied to the native cattle of Teesdale, the Durhams or "Shorthorns" by the brothers Colling, who died in 1820 and 1836, respectively. Their work, continued by the Booths and by Bates, resulted in the modern Shorthorn, the typical beef-producing cattle of the world, with which, in the main, all the newer countries have been stocked.

The same progress was applied to other local breeds of cattle; the Herefords and the Devons in England, and the Aberdeen Angus in Scotland, have in the same way attained to far more than a local reputation, as also have several of the breeds of sheep, like the Southdowns or the Lincolns. Notwithstanding the existence in all old-settled countries of indigenous races, stock of British breeds are to be found all over the continent, either kept pure or more generally used for grading up the local type; while in the newer countries, which have become the great food producers of the world, none but breeds of British origin are to be found, with the exception of the Frisian or Holstein cattle, the Merino sheep and the Percheron horse. And the United Kingdom remains the great foun-

tain from which these countries find it necessary to replenish their breeding stock, so that the production of pedigree animals of high quality continues to be one of the most lucrative items in British farming.

Agricultural Districts.—Farming, at the present time, has become by force of circumstances a highly specialized business, showing great adaptation to the diversities of soil, climate and markets in the British Islands. To review the condition of the industry it will then be necessary to consider the country, district by district. Beginning with the southeastern counties; Kent, Sussex, Surrey, and Hampshire form a fairly defined area, possessing in general a warm and dry climate. Here, but particularly in Kent, may be found the greatest development of market-gardening, fruit growing, hop cultivation, and other similar highly intensive forms of farming. As far as regards the production of very early crops this district cannot compete with the Channel Islands or Cornwall, but as main crops the standard green vegetables are grown in great breadths. This district is also noted for its hardy fruit growing; near Southampton on one hand and later in North Kent the greater part of the strawberries for London are produced. The best cherries have long been a special feature of East Kent, which country is also the largest producer of plums, apples, currants, and nuts. East Kent from Canterbury to Rochester, and the Medway Valley to Tonbridge, show without doubt the best kept orchards in the country. Hop cultivation is also another leading feature of this district; no other farming industry is carried on so intensively or spends more on labor during the growth of the crop. The best of the hops march with the fruit in East and Mid Kent, but Sussex is also a large grower, as also is a belt of rich land stretching from Farnham in Surrey as far as Petersfield in Hampshire. The district under review has not perhaps the same reputation for general farming as it has for fruit and hops; it possesses, however, several distinct and valuable races of stock. The Southdown sheep are natives of the open chalk downs of Sussex; small, fine-wooled, and models of symmetry, they have been extensively used for improving the mutton of other breeds and form a great element in the foundation of such breeds as the Hampshire and Oxford Downs, the Shropshires and the Suffolks. Kent possesses in the "Romney Marsh" sheep one of the older breeds of the country; big, hardy, and long-wooled, which have lately proved valuable for crossbreeding in all parts of the world. The Hampshire Downs constitute a large framed, rapidly-growing breed that has been formed from a local coarse sheep by crossing with the Southdown. It exists in large numbers on the light arable lands of the great chalk area of which Hampshire forms the centre. Sussex also possesses a local breed of cattle; a horned, all-red, typically beef-producing breed, which has not spread greatly beyond its proper borders. Hampshire passes insensibly into the West Country—Wiltshire, Dorset, Somerset, Devon, and Cornwall—a typical stock district, showing less and less

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arable land toward the west. This is one of the chief dairying countries, milk being sent to London; while Somerset, in particular, is the original home of the "Cheddar" cheese, the typical cheese turned out nowadays on such a large scale in the United States and Canada. The cattle are mainly Shorthorns, though Devon possesses a dairy breed of its own, the South Hams, which have been raised from the true Devons by an infusion of Guernsey blood. The true Devons are an all-red, beef-producing breed, doubtless of common origin with the Sussex, but which has gone all over the world as among the thriftiest and most profitable of grazers. The Dorset horned sheep are characteristic of this area, a short-wooled, horned breed valuable for the production of early lambs. Somerset and Devon are also great apple-growing counties, though the fruit does not receive the care which is to be found in Kent, and much of the product is only useful for cider-making. The southwest of Cornwall possesses an extremely mild climate, frosts being few and of no great severity; it has therefore become an important market-gardening district for the production of the earliest green vegetables and potatoes. The Channel Islands share the same advantages of climate, and, thanks to the skill and industry of their inhabitants, form perhaps the most prosperous agricultural community in the Kingdom. The land is divided into small holdings and is highly rented, but the farming is intensive and the crops valuable. In Jersey early potatoes, followed by green vegetables, form the staple crops; in Guernsey there has been a great development of farming under glass; cucumbers, tomatoes, grapes, early beans and flowers being the chief products. Each island possesses a special, though closely-related, breed of cattle, which by law has been kept pure and unmixed from any foreign blood for more than a century. These Channel Island breeds represent the descendants of an original Celtic race of cattle and are distinguished by the tendency to a yellow skin and black hair; they are small in frame, and produce large quantities of milk far richer in butter than that of any other breed. The Jerseys, in particular, have been largely exported to America as milk and butter producers.

The West Country shades off into the west Midlands — Gloucester, Hereford and Worcester, counties growing much hardy fruit and typical producers of cider. Here also is situated the other hop-growing area in the British Islands, the acreage under hops in the valley of the Teme and its tributaries tending to increase, while it diminishes in the southeast. This district is the original home of the Hereford cattle, red with white faces, which have become one of the great cosmopolitan races, famous all the world over as hardy stock fattening readily upon grass.

The Midlands proper are almost wholly laid down to grass; the broad belt of strong pastures lying on the Lias and other Jurassic clays, and stretching from Devon to Yorkshire, forms the great milk and meat-producing area of England. The cattle are mainly Shorthorns, as being valuable for both meat and milk, but many Herefords,

Galloways and Welsh black cattle will also be found fattening on the richer pastures. While these Midland pastures largely send new milk into the great towns, a good deal of cheese is made, the best known variety being the "Stilton," which is as typical of the English soft-curd cheeses as "Cheddar" is of the hard curd. Eastward the land comes more under the plow, Essex, Suffolk, Norfolk and Lincoln being typical arable counties. Lincoln possesses a large area of "warp" land composed entirely of alluvial sediment, and this, of great fertility for all purposes, is very largely given up to the growth of potatoes. On the strong soils of Essex and Suffolk the best English wheat is grown, wheat being still a profitable crop in this district; while Suffolk and Norfolk enjoy a great reputation for the growth of high-class malting barley. These counties are still, though not to the same extent as formerly, great centres of stall-feeding of cattle. Welsh "Runts," Shorthorns, and Aberdeen Angus stores are brought in and rapidly fattened on the turnips drawn from the arable land. Norfolk possesses a native breed in the Red-Polled cattle, valuable for both their flesh and their milk-producing powers, and which are rapidly establishing a reputation outside of England. In Suffolk also is to be found a special breed of heavy horse, the Suffolk Punch, a compact, thick-set animal of great value for farm work. All the low-lying country forms a fine breeding ground for horses, which is one of the staple industries of the eastern counties. The fen country indeed is the original home of the typical English "great" horse, the Shire horse, the most powerful animal of its kind in the world, particularly adapted to heavy work in cities. Bay, brown, and black are the commonest colors, and the feet and legs are heavily feathered with white hair; the breed probably owes its origin to an influx of Flemish blood into the old English draught horse. Lincoln also possesses the chief of the English long-wooled races of sheep; heavy, rapid-growing animals, with a great fleece of long slightly lustrous wool. The Lincolns have been exported in large numbers to Australia, New Zealand and the Argentine for crossing with the Merino to yield a sheep equally valuable for both mutton and wool.

Turning to the west again, Wales is a country almost wholly in permanent grass; dairying and the raising of store cattle to be fattened in the midlands and east of England being the prevailing industries. The Welsh black cattle are good milkers, and, in addition, have long been esteemed, under the name of "Welsh Runts," as hardy, thrifty grazing cattle, producing beef of high quality. Like all mountainous countries, Wales has a race of hill sheep, but on the lower lands, and especially in the border counties, the "Shropshire" breed will most commonly be seen. The Shropshire sheep is a short-wooled, small-framed animal, rather larger and hardier than a Southdown, but otherwise fulfilling the same purposes, as a symmetrical, rapidly growing sheep, producing mutton of the highest quality upon grass land and the lower hill pastures. On

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the Welsh borders also is to be found one of the native breeds of hill ponies, very slightly different from the two other breeds living upon Exmoor and in the New Forest, but quite distinct from the Shetland ponies, which are doubtless of Scandinavian origin.

Yorkshire provides perhaps the most varied farming in England; on the one hand there is the rich warpland adjoining the Humber, and the elevated arable sheep-farming land of the Wolds, then the highly-farmed general-purpose land of the central plain which merges into the upland sheep walks of the limestone country in the northeast. Horse breeding, stock raising and dairying are the mainstays of Yorkshire farming, and though no breeds of great note are associated with Yorkshire, except the white Yorkshire pigs and the Cleveland Bay Coach horse, it should not be forgotten that the original home of the Shorthorn was just as much the North Riding of Yorkshire as the Durham Tees-side, with which their name is always associated.

In the Northern Counties generally may be seen some of the best arable farming in England; a four-course rotation is generally followed, the foundation of the whole system being a good crop of Swede turnips, part of which are fed on the land to sheep, part carted off for fattening stock in the yards. Barley is the money-making crop in the rotation, oats being the other cereal usually grown. The typical cattle of all this district are Shorthorns; in Cumberland, which is more of a grazing country, they are of the milking type, the beef strains predominating in the eastern side. The sheep are the Cheviot breed for the hill pastures, and the Border Leicester, which was originally produced by crossing the Cheviots with Bakewell's Leicester breed.

Scotland and Ireland.—Crossing the border in the Lothians of Scotland will be found the most highly-farmed general-purpose arable land in the British Isles. Here the management of the land, the utilization of labor-saving machinery, and the application of skill to intensive cultivation, reach a higher pitch than anywhere else in the world. The cropping is much the same as that of the other northern counties, but potatoes form the most remunerative crop; in the famous Dunbar district they are often sold standing in the field for £30 per acre.

The southwest of Scotland is preëminently a grazing district; it is the home of two of the most distinct breeds of cattle, the Ayrshire, a typical dairy cow, yielding milk particularly suited for cheesemaking, and the Galloway, a polled black animal, characterized by its great hardness and the fine quality of its beef. For generations the Galloways, either pure, or in the well-known "blue gray" cross, have been exported to be fattened in the Midlands and east of England. The more northern counties of Scotland naturally, in the main, consist of grazing land. They have their typical race of Highland cattle and also carry the Scotch black-faced sheep, both slowly-maturing hardy breeds, producing meat of high quality. The eastern counties, particularly Aberdeen, show some highly-farmed arable land, noted for

the magnitude and high quality of its turnip crops, on which the cattle are stall-fed through the winter. For this purpose another race of cattle, now of cosmopolitan distribution, has been evolved, the polled black Aberdeen-Angus, massive animals noted for their rapid growth, symmetry, and quality of flesh.

Irish agriculture is of two classes; on the one hand there exists, especially in the west, a great number of small holdings, worked entirely by the single family, producing potatoes for home consumption and a little oats for sale, in addition to the milk or butter from a few cows on the rough grazing attached to the holding. The farming of these peasant proprietors is naturally of a primitive character, but the efforts of the Irish Co-operative Organization Society and later of the Irish Board of Agriculture have, during the last ten years, done much to ameliorate the conditions under which they are working, particularly by the introduction of co-operative creameries. The Irish peasant farmer has quickly learnt to work on co-operative principles, so that the movement toward co-operation, which has been headed by Sir Horace Plunkett, has enormously improved the character of Irish butter, a staple article in the English market, and must have nearly doubled the returns to the producer. On the other hand, Ireland possesses large farms of the richest grazing land on which are bred great numbers of store cattle of the Shorthorn breed for the English market, as well as light horses of the best strain, wholly or nearly thoroughbred. The high quality of the pastures give these animals a foundation of bone and vigor of constitution which makes them respond freely to richer conditions in later life.

Science and Education.—Any survey of British farming for the last century would be incomplete if it did not take some account of the scientific and intellectual resources which have been at the service of the British farmer. Of these the Rothamsted Experiments form the main, practically the only, British contribution to the world's stock of agricultural science. The foundation of these field experiments dates back to 1843, in which year J. B. Lawes, a Hertfordshire landowner, obtained the co-operation of J. H. Gilbert to carry out experiments upon field crops upon his own estate. This partnership in investigation lasted for nearly sixty years, the continuity of the work being secured by a Trust founded and endowed by Lawes. The main feature of the Rothamsted investigations has been field experiments with the various farm crops, conducted on a large scale and over a great period of time, and to them the farming community owes its knowledge of the principles of the nutrition of our domesticated plants. Rothamsted was the forerunner of the many agricultural experimental stations which have been created in other countries; the first German Station at Möckern dates from 1852, the first American station at Middletown, Conn., having been founded in 1875. It is noteworthy that though agricultural research has in every country become the business of the State, Rothamsted remains the only institution of its kind in the British Islands and enjoys no assistance from public funds.

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From about the same period as the foundation of the Rothamsted Experiments, dates the establishment of the Royal Agricultural Society, which, by its institution of national agricultural shows held year by year in different parts of the country, has done much to foster the improvement of English live stock. For a long time also this society by its 'Journal,' by its appointment of consulting scientific advisers, by undertaking analyses for its members, was a great educational factor in the country, but the work of the society in this direction has of late years been largely taken over by other and more widespread agencies, while the society has no longer found fresh pioneer work to do but has more and more confined its energies to its annual show.

Agricultural education in Great Britain was for a long time restricted to private enterprise, the Royal Agricultural College at Cirencester being the first, and for a long time, the only institution giving a systematic training in agricultural science. Edinburgh was the first university to give any instruction in agriculture, until in 1890 the allocation of certain excise revenues for technical instruction enabled the country generally to make a start with agricultural education. The last decade has in consequence seen the establishment of a number of schools and colleges for agricultural instruction, so that at the present time practically the whole country is in touch with some institution of secondary or university type, which, as a rule, aims both at educating the future farmer and at providing expert assistance for the current generation.

Summary.—From this brief survey it will be seen that the characteristic feature of British farming has been its individuality;

Whether this policy will continue to answer in the face of the State-trained and State-directed competition for the English market of all the other agricultural communities, will be settled during the coming generation; it may then turn out that the much belauded "principle" of *laissez faire* is but a cloak for lack of knowledge and slackness in the governing class.

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23. Great Britain—Fisheries. The great extent of seaboard in proportion to the area of the United Kingdom combines with the wealth of the surrounding seas in food fishes to render the fisheries a very important branch of British industry, as may be seen from the following table compiled from the returns for 1904.

	Regular Fishermen Employed			Fishermen Occasionally Employed			Total
	In Trawling (except for Shrimps)	In other modes of Fishing	Total	In Trawling (except for Shrimps)	In other modes of Fishing	Total	
England and Wales....	16,499	16,870	33,369	1,396	7,245	8,641	42,010
Scotland.....	2,379	25,560	27,939	59	10,061	10,120	38,059
Ireland.....	1,315	7,105	8,420	291	17,770	18,061	26,481
Isle of Man.....	128	497	625	.....	231	231	856
Channel Islands.....	100	420	510	25	167	192	702
Total.....	20,421	50,442	70,863	1,771	35,474	37,245	108,108

its great advances have been made by individuals; its good qualities and its visible weakness are alike the result of solitary work and internal competition. Despite the apparent diversity of their interests landlord and tenant have, in the main, pulled together; the landlord has always been the spokesman and has represented agriculture in the legislature. But there the farming interest has been wholly ineffective; the State has never recognized any responsibilities toward the industry, either in the way of protection against competition or in the provision of intelligence or education.

This table does not include the persons engaged in the secondary occupations connected with fishing, such as boat-builders, coopers, packers, curers, net-makers, etc. These were estimated in 1904 to number 48,562 in Scotland alone; if the ratio may be assumed to be the same in the other parts of the United Kingdom, the total number of persons deriving a livelihood from the sea fishing industry, exclusive of salmon fishing, cannot be far short of a quarter of a million.

The total weight and value of fish (not including salmon) landed in the United Kingdom during 1904 is shown in the following table:

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	England and Wales	Scotland	Ireland	United Kingdom
Wet fish { weight.....	cwts. 11,365,484	cwts. 7,947,829	cwts. 951,836	cwts. 20,264,749
{ value.....	£6,489,024	£2,231,202	£344,154	£9,065,180
Shell fish, value.....	£209,063	£76,800	£49,476	£416,339
Total value	£6,779,987	£2,307,902	£393,630	£9,481,519

This result, which may be taken as being above the average of recent years in weight, but considerably below the average aggregate value, was attained by the employment of 26,074 vessels and boats, of which 8,962 were registered in English ports, with an aggregate tonnage of 162,431; 10,891 in Scottish ports, aggregating 140,396 tons; and 6,221 in Irish ports, of which the total tonnage is not recorded.

A notable change in the character of the British fishing fleet has been in progress during recent years, owing to the substitution of steam for sailing power. The result has been a great extension in the fishing ground. The North Sea, of course, remains a most productive source of supply, and five-sixths of the steam trawlers working there are British. Thus in 1904, while foreign steam trawlers registered at North Sea ports numbered 202, there were 1,282 registered at English and Scottish North Sea ports. But, outside the North Sea, powerful steam trawlers and liners from the east coast of England and Scotland now carry on their operations off Iceland and the Faroe Islands, in the Bay of Biscay, and off the coast of Portugal. In 1904 a new trawling ground in 70 fathoms was opened off the coast of Morocco. Much of the catch in these distant waters never finds its way into the British market, and consequently does not figure in the returns above quoted. "For instance, one English trawler fishing off the French coast, near Brest, in 70 fathoms, too 300 kits of fish, which, in the Lisbon Market, some 600 miles distant, realized £444. On the next day the same vessel commenced fishing off Cape Finisterre, in 120 fathoms, and in four days returned to Lisbon, and sold some 200 kits for £378."*

The rapidity with which steam is taking the place of sails in the larger English and Scottish boats may be seen by comparing the statistics of different years:

England and Wales	1893		1904	
	Steam	Sailing	Steam	Sailing
First class boats....	564	3,270	1,478	1,755
Second class boats..	4,099	4,099	16	4,095

Scotland	1895		1904	
	Steam	Sailing	Steam	Sailing
All classes.....	158	22,940	474	10,417

In Ireland, out of a total of 6,221 vessels actually engaged in sea-fishing during 1904, there were only one steam beam trawler, and nine steam otter trawlers against 168 sailing boats employed in the first and 255 in the second method of fishing. There were no steam line fishers.

Steam power, at first employed only in trawling vessels, is becoming annually more common in drift net and long line fishing. Drift nets are employed for the capture of herrings, mackerel and pilchard, of which the relative importance as articles of food and commerce may be inferred from the quantities of each landed in British and Irish ports during the year 1904:

	England and Wales	Scotland	Ireland	United Kingdom	Total value
Herring	cwts. 3,199,303	cwts. 5,432,494	cwts. 286,496	cwts. 8,918,293	£1,870,219
Mackerel	518,569	16,493	502,501	1,037,563	417,070
Pilchard.	175,552	.....	.....	175,552	47,450

The development of mackerel fishing on the west coast of Scotland has been retarded hitherto owing to want of curing stations: Thus in September 1904, one boat landed 60 crans of fine mackerel at Kyie of Lochalsh, of which 40 crans were sold fresh at 8s. a cran, and 20 crans had to be thrown overboard because there was no means of curing them. A cran of mackerel contains an average of about 400 fish.

While the local herring fishery is actively pursued from almost every creek approached by the fish, powerful boats from Yarmouth, Lowestoft, Grimsby, and 10 other principal English ports, and from Eyemouth, Leith, Fraserburgh, Buckie, and 14 other Scottish ports seek out the most productive waters irrespective of vicinity or distance. In this respect, men of the east coast are far more enterprising than those of the west, owing, no doubt, in great measure to their proximity to the excellent fishing grounds in the North Sea; but it appears that, of the three main races contributing to British ethnology, men of Anglo-Saxon and Scandinavian descent take more readily to maritime pursuits than do the Celts. A considerable portion of the fish landed on the west coast of Britain and in Ireland are taken by east coast fishermen; and those places on the west coast where the local industry is most active, such as Stornoway in Lewis and Peel in the Isle of Man, and Morecambe Bay in Lancashire, remained long under Norse dominion, and contain a strong Norse element in the population. Roughly speaking, the Saxon and Scandinavian blood is stronger in the east, the Celtic in the

* Board of Agriculture and Fisheries: Report 1904, p. xxiii.

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west, throughout Great Britain, which may account in some measure, at least, for the great disparity in fishing enterprise among the local population on the respective coasts.

The British export trade in cured herrings is very large, amounting to 2,543,873 barrels in 1904. Germany and Russia have long been the chief customers. Notwithstanding that the German import duty is 3s. per barrel, and the Russian 13s. per barrel, the number of barrels consigned to Germany in 1904 was 1,649,144, valued at £1,656,921, and to Russia 526,050, valued at £547,417, being together upwards of four-fifths of the whole export. About 50 per cent of the herrings landed in Germany are sent over the frontier into Russia. The United States took 57,291 barrels in 1904, valued at £104,883, and that country is the principal importer of pickled mackerel from the Irish fisheries.

Pilchards, which are taken only on the south and southwest coast of England, find their best market in Italy, which in 1904 took 18,381 hogsheds, valued at £53,953, out of a total export of 19,272 hogsheds. It requires from 560 to 600 lbs. of cured pilchards to fill a hogshed.

It is a singular fact that, notwithstanding the large export trade in fish from the United Kingdom, amounting in 1904 to the total value

coast, which line passes within parts of some of the prohibited areas, such as the Moray Firth, the jurisdiction of British courts cannot apply to foreign trawlers working in such areas, provided they keep outside the three-mile limit. Consequently, fish may be and are taken by foreign trawlers upon ground closed to British trawlers by the act of their own legislature; and such fish may be landed in British ports to the natural indignation of those fishermen upon whom the prohibition is effective. Meanwhile, disinterested scientific opinion remains sharply divided upon the question whether the protection of these areas has any appreciable effect upon the general stock of fish in the adjacent seas, though it is undoubtedly in favor of the line fishermen, to whom the prohibition does not apply.

The fish taken by trawl and line are technically divided into round and flat fish; the principal round fish being haddock, cod, ling, whittings, saithe, torsk, conger eels, gurnards, catfish, anglers and hake; the principal flat fish being flounders, plaice, brill, halibut, soles, lemon soles, turbot. The English and Irish fishery returns do not show the amount of the total catch of these fish taken by trawl and line respectively, but the proportion in Scottish waters is indicated in the following table for 1904:

	Line		Trawl		Total	
	cwts.		cwts.		cwts.	
Round fish.....	628,898	£279,428	1,520,949	£618,687	2,149,847	£898,115
Flat fish.....	120,211	80,703	180,709	221,212	300,920	301,915
Unclassified (skate, squid, etc., the squid being taken in nets)..	4,631	1,054	1,910	435	6,541	1,489
	753,741	£370,185	1,703,568	£840,334	2,447,308	£1,201,519

(including salmon) of £3,555,066, the total imports go far to balance it, amounting in the same year to the value of £3,332,656, of which cured and salted fish to the value of £925,793 was re-exported.

Next to drift net and trawl fishing, the chief branch of sea-fishing is conducted by long lines. The relative importance of these different methods varies very much in the three Kingdoms. Thus in England, out of 33,369 regular fishermen, 16,499 are employed in trawling (not including shrimp trawlers); whereas in Scotland only 8 per cent, and in Ireland only 15 per cent of regular fishermen were so employed. Considerable friction has arisen in the past between trawlers and line-fishers, owing to the destruction of lines laid upon ground over which trawlers worked. Deeming it undesirable that the more ancient and local industry of line-fishing, often pursued by men of humble means, should be sacrificed to the interest of persons of capital and residing at a distance from the fishing grounds, and also actuated by a desire to prevent the destruction of undersized fish within favorable nursery grounds, Parliament has conferred powers upon the Fishery Boards of the three Kingdoms to schedule certain areas within which trawling is prohibited. But, whereas the territorial waters of Great Britain and Ireland are circumscribed by a line drawn at a distance of three miles from the nearest

The importance of the fishing industry as a nursery and reserve of practised seamen can hardly be overrated in a maritime nation, nor is it to be feared that the steady displacement of sails by steam in the fishing fleet will impair its value in that respect. The same qualities of mind and body which distinguished seafaring men of the old school are those which best fit their descendants for handling and managing modern warships and trading vessels; and the greater distance from port at which the more powerful class of vessel now employed enables men to follow their calling, requires competent knowledge of navigation as well as skill in seamanship. Upon the social system of regular fishing communities the effect of the change is considerable.

"Fishing," wrote Professor Mackintosh about the Scottish fishers of the east coast, "was to be carried out no longer by more or less independent crews, bound together by blood relationship or other ties, and whose working hours were largely regulated by the weather and tides, or their own convenience and necessities. Yet their whole domestic life was interwoven with the time-honored pursuit. Their wives and daughters laboriously baited the hooks and arranged the lines in the baskets for 'shooting'; they gathered the bent-grass for separating the layers of the line, and, with the sons, dug lob-worms or procured the mus-

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sels for bait. . . Now (1883) active and powerful vessels, propelled by steam, and thus more or less independent of weather, manned by a captain responsible to owners or their manager, a crew bound together only by discipline and pay, and whose fishing apparatus required no bait, appeared on the field. . . . Capitalists took up the question, and fitted out powerful ships in both England and Scotland, and sent them into Scottish waters, so that liners met with most formidable rivals." *

The stern realities of their calling have imparted a gravity of demeanor upon the class of sea fishermen on all parts of the coast; statistics, were it possible to obtain them, would probably reveal them as among the most orderly and law-abiding of the community. Among the fish-wives of Newhaven and Musselburgh is preserved almost, if not quite, the sole survival of national costume. The short, heavy-pleated, dark skirt, the woollen hose and serviceable shoes, the striped "bed-gown" or blouse, and the thick pilot coat are probably identical in form and material with those which Queen Mary may have seen on landing at Leith in August 1561. In those days, and for long afterward, the fish-wives used to trudge up to Edinburgh market, with the heavy "creel" on their backs supported by the leathern band across the forehead. They come up by cheap trains nowadays, but their presence in the streets in their picturesque dress and archaic equipment affords a welcome note of local color in the monotonous uniformity of a modern metropolis.

Notwithstanding this severe competition, the line-fisher's industry continues to be fairly remunerative. In the 'Official Report' of the International Fisheries Exhibition, 1884, the late W. Spencer Walpole, Inspector of Fisheries, combated the idea that the average fisherman's lot is harder or his earnings smaller than that of agricultural laborers. "I do not think," said he, "that anyone who has any acquaintance with the fishing community will endorse that statement. If you examine an ordinary fisherman's dress, you will find it warmer and more costly than the laborer's. . . . he consumes a larger proportion of animal food than the laborer. . . . You will find rows of cottages not merely occupied, but owned, by fishermen, built or purchased out of the profits of the fisheries. . . . Many of them own their own nets and lines, and some of them have a share in the boats in which they sail. . . . Many of the masters are boat owners, with £250 to £1,500 of capital, who have begun their lives as ordinary fishermen." If steam has invaded the industry of local fishermen on the one hand, it has extended his opportunities on the other by giving him access to more distant markets.

Commercially the salmon fisheries of the United Kingdom are of considerable value, but the nature of that industry is not such as to affect the character of the population in different localities in such a marked manner as do the seafisheries. Some idea of the extent of the fishery may be had from the consignments of fresh salmon to Billingsgate (Lon-

don) market. These have averaged annually during the eight seasons, 1896-1903:

English and Welsh.....	1,435 boxes
Scottish.....	13,177 "
Irish.....	4,062 "
Total average.....	18,814 boxes

Each of these boxes weigh about one hundredweight.

There remains to be noticed the institution in British water of a new branch of the fishing industry, technically, so called, although the object of pursuit is not a fish, but a mammal. Previous to the invention some twenty years ago of the bomb-harpoon, the mighty rorqual or finner whale, which abounds in the North Atlantic, was too powerful a quarry for whalers to attack. Now, however, steam whalers armed with this formidable artillery, are sent regularly in pursuit of rorqual, and during the present century three whale fisheries have been established by Norwegian companies in the Shetland Islands.

Bibliography.—'Annual Reports' of the Board of Agriculture and Fisheries (England), the Fishery Board for Scotland, and Department of Agriculture and Technical Instruction for Ireland; 'The Resources of the Sea,' by Prof. W. C. McIntosh, F. R. S. (in which the idea that steam trawling is unduly injurious to the general fishing industry is warmly denied) (1899); 'Official Report,' International Fisheries Exhibition (1884), containing a vast amount of detailed description of the various modes of fishing and kinds of gear; 'British Fisheries, their Administration and Problems,' by James Johnstone (1905); 'Sea and Coast Fishing,' by P. G. Aflalo (1901), dealing with the sporting aspect of sea-fishing; 'Report' of the Royal Commission on trawling (1878).

HERBERT EUSTACE MAXWELL,
Lord Lieutenant of Wigtownshire; President of the Society of Antiquaries of Scotland; Author of 'British Fresh-Water Fisheries,' etc.

24. Great Britain — The Mining Industry. When it is considered that mining enterprise in Great Britain and Ireland accounts, at the present time for the employment of no less than 974,634 persons directly engaged in the production of 249,021,651 tons of minerals estimated to be worth, at the mines and quarries from which they are drawn, the sum of £97,477,639, the vastness of the industry, and its effect on the economic life of the country will perhaps be more fully realized than by the recital of detailed descriptions of the various branches of mining. Indeed it may be said that the wealth of Britain is mainly due to the unique position, mineralogically, that it occupies relatively to other nations; for no country contains, proportionately to its area, so great or so varied a store of mineral wealth.

Mining in the United Kingdom is usually treated as coming within one of two categories,* viz.: 'metalliferous mines,' and 'those which are governed by the Coal Mines Regulation Act, the latter comprising chiefly coal and stratified ironstone mines, and being by far the

* 'The Resources of the Sea,' by Prof. Mackintosh (1899).

* For reference see end of article

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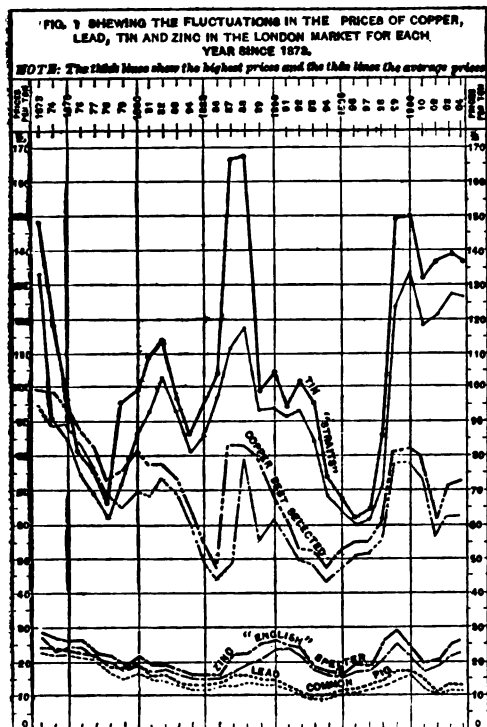
most extensive and important section, though a development of later growth, having expanded through seven centuries to what, as judged by some, is believed to be its zenith.

Of the metalliferous deposits⁸ mined in the United Kingdom, the most important are, and have always been, the ores of tin, copper, lead and iron. Native silver has never been worked, and it is doubtful whether it occurs in Britain or Ireland, although Strabo writing about 19 A.D. mentions silver as well as gold as being among its products.⁹ Tacitus also makes reference to it indirectly.¹⁰ Gold is very sparsely disseminated, occurring in mineral veins, found chiefly in Merionethshire¹¹ (North Wales), Lanarkshire (Leadhills, Scotland) and Cornwall; and in some alluvial deposits in Sutherlandshire (Scotland) and Wicklow (Ireland).

Probably the earliest mining on commercial

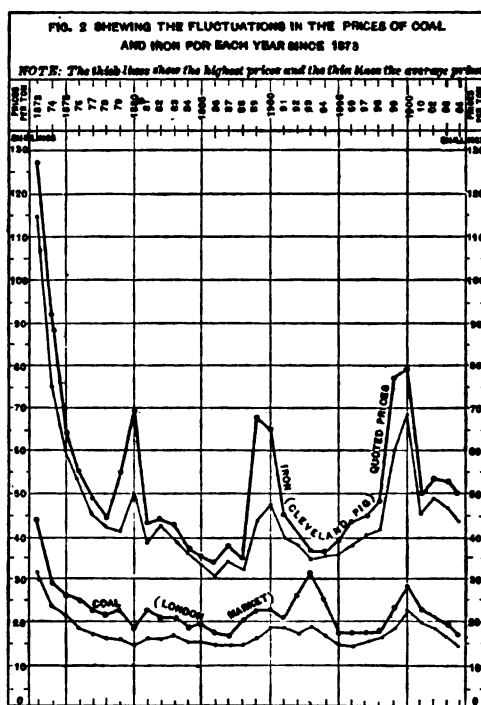
centuries later, the production¹² (during the decennial period 1766-1775) was abnormally large, and as late as 1888 we find no less an authority than the late Mr. D. C. Davies¹³ stating that *for their size* the British Islands constitute the greatest copper producing country of the world, but the production has greatly dwindled since the time he wrote. Cornwall and Anglesea are the chief copper bearing districts in the kingdom, and very remarkable profits have, in times past, been derived from some of the mines.¹⁴

The production of lead far exceeds that of tin and copper,¹⁵ and as in the case of tin and copper, signs of a revival are not wanting, still, it is very doubtful whether this branch of mining in the United Kingdom will in the near future attain to a similar state of prosperity as that experienced about the year 1877. Lead mining



lines in Britain was that of tin. The "cassiterides,"¹⁶ whence the Phœnicians obtained their British tin, were, in all probability what are now known as Scilly, the Channel Islands, and, more particularly, Cornwall. The industry is and always has been restricted to Cornwall and, to a very small extent, to the contiguous part of Devon, and as early as 60 B.C. we find Diodorus Siculus describing the tin trade of these parts. In the early years of the 19th century (1817) Cornwall was the chief source of production of the world's supply of tin, now it stands fifth on the list of tin producing countries, contributing only 4.7 per cent of the total production.

What has been written of tin is also largely true of copper. Carew¹⁷ said, writing about 1600, that he could not find that it was being profitably worked in the west of England, yet nearly two



in these islands is of considerable antiquity; we know that lead ore was mined in Shropshire in the days of the Emperor Hadrian from the fact that "pigs" of lead were some years ago discovered in the refuse heaps of the Roman gravel mines in that county, one of which is preserved in the Geological Museum in Jermyn street. It may be mentioned of this district that, though possibly the smallest mineralized area in Europe, it was believed by so great an authority as the late Sir Roderick Murchison¹⁸ to be probably unequalled for its size, in point of wealth in lead ore.

In Shropshire, North Wales, Cornwall, Isle of Man and the Pennine Chain are situate the chief lead mining areas of the kingdom. Lead mining in general, however, is not being very profitably conducted at the present time in the United Kingdom. Though far from being ex-

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hausted, except in few instances, the mineral veins are not of such a character as to allow of their being as cheaply exploited as the richer deposits of Spain, Australia, and some other extensive lead-producing countries. As these more bountiful districts become exhausted, prosperity will return to British lead mining.

Fig. 1 shows diagrammatically the fluctuations in the prices of copper, lead and zinc in the London market for each year since 1873 to 1904 inclusive.

The iron ore deposits of Great Britain¹⁴ are of two kinds, viz., stratified iron ore—the mines of which come under the control of the Coal Mines Regulation Act and the “mass” and “veined” deposits of hæmatite which come within the jurisdiction of the Metalliferous Mines Act. Cumberland and North Lancashire which yield an output of nearly one and a half million tons, are the source of the famous red hæmatite which chiefly occurs in the form of huge irregular masses in the carboniferous limestone and is the richest iron ore of the country, yielding

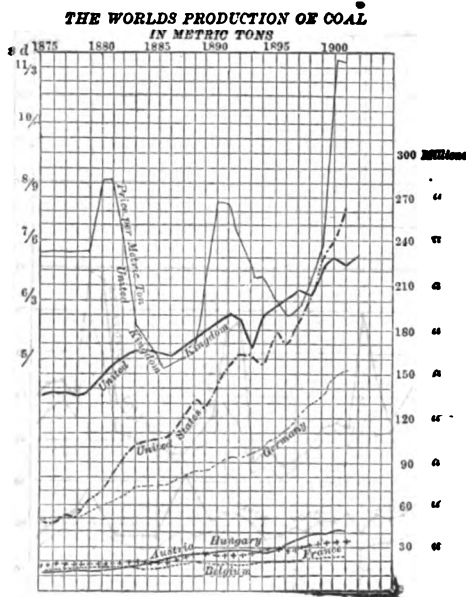


FIG. 3.

on the average over 50 per cent of metal. Working one of these masses is probably the most extensive iron mine in the world—the Hodbarrow mine.¹⁵ The other principal iron producing districts are Cleveland (N. Yorkshire), which accounts for nearly five and three-quarter million tons annually, Lincolnshire, Northamptonshire and Leicestershire together supplying over four and a half million tons, the total production being nearly fourteen million tons annually, valued at over three million sterling.¹⁶ The Cleveland clay ironstone (carbonate of iron) is chiefly worked from a bed about 10 feet thick, in the Middle Lias, containing on the average about 30 per cent of iron. The ore from Lincolnshire, Northamptonshire and Leicestershire is derived from open workings in a bed of brown iron ore in the Inferior Oolite,

and averages about 33 per cent of metal. The Scottish ore and that from North Staffordshire is largely worked from the Black Band ironstones (carbonate of iron) in conjunction with the coal in the collieries of those districts and varies considerably in richness of metal.¹⁷ Fig. 2 is a graphic representation of the fluctuations in the price of coal and iron (London market) for each year since 1873 up to last year.

A description of British mining would be incomplete without some reference to the production of slates,¹⁸ as in no country are there yielded slates of a quality equal to those of North Wales. The mines proper are mostly in Merionethshire, whereas the quarries are worked in Carnarvonshire, the Penryhn quarry, near Bangor, being the largest open working in the world, the underground workings of the Oakley Slate Quarry Company, Ltd., at Festiniog, Merionethshire, being the most extensive slate mine. The output of finished products from the individual mines and quarries constitutes only a part of what is drawn from the workings, it being calculated that there is a loss of about two-thirds in the “dressing” (cutting and shaping) of the slates.

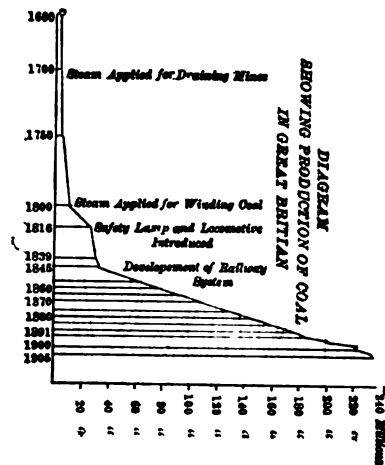


FIG. 4.

No description is given in this review of the production of building and other stones derived chiefly from quarries, as space does not permit of allusion to other than the more purely mining part of this subject.

The chief sources of the mineral wealth of the United Kingdom is in the coal and iron deposits. Of the latter mention has already been made. The former far outweighs in importance all other branches of mining classed together.

Until the year 1899 the United Kingdom was the largest producer of coal in the world (see Fig. 3); it now stands second, the United States having outstripped it in the race for supremacy in this respect.

When coal first came to be worked in this country as a merchantable article, authorities are not agreed. It may have been worked in a desultory and uncertain fashion in very remote times, but the first substantial mention of coal

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mining is that contained in the records of Holyrood and Newbattle Abbeys," in which it is shown that coal was dug on the south shore of the Firth of Forth in Scotland about 1200 A.D.; further, we know that coal was imported into London from Newcastle about 1257. Indeed, Novacastrians may justly claim the banks of the Tyne as nursery of the coal trade, and to the present day the inhabitants have more than maintained their heritage of skill and foresight, for there is no field in which the mining industry rejoices in better management, both in respect of the mining operations themselves and in the conduct of labor affairs, than the Great Northern coal field. The systems of "joint committees" of representatives of owners and men, and the respective associations of mine owners and of the workmen in Northumberland and Durham constitute a pattern to be studied and an example to be followed by every other mining district wherever it may be, conducting, as they have done in an eminent degree, to the equitable conduct of the trade and the harmonious relations existing between employers and workmen.

There is, perhaps, no trade, excepting the iron-making industry, more subject to variations of prosperity and depression than coal mining. It is often remarked that it is the first to prognosticate a cycle of general depression and the last to recover therefrom. Be that as it may, the words of the old chronicler¹ have a strangely modern ring about them, when read in the light of recent experience. "Many thousands of people," he remarks, "are employed in this trade of coales: many live by working of them in the pits: many live by conveying them in wagons and waines to the river Tyne: many men are employed in conveying coales in keeles from the stathes aboard the ships; one coal merchant employeth five hundred or a thousand in his works of coals: yet for all his labour, care and cost, can scarce live by his trade. * * * Nay, many of them hath consumed and spent great estates and dyed beggars." The conclusion of the whole matter appeared to him to be that "their Collieries is wasted and their monies is consumed; this is the uncertainty of mines—a great charge, the profit uncertain."

It is not proposed to follow the history of development of the coal trade in detail. The rate of this expansion and how it has been affected by various improvements in mining and facilities of transport are marked in the accompanying diagram, Fig. 4.²

One of the most remarkable characteristics of the carbonaceous deposits of this kingdom other than the number of the separate fields and their extensive area is the great variety in the fuel itself. The coal fields may be divided into groups as follows:

I. ENGLISH COAL FIELDS.

Midland Group.—(1) North Staffordshire; (2) South Staffordshire; (3) Leicestershire; (4) Warwickshire.

North Midland Group.—(1) Yorkshire; (2) Derbyshire and Nottinghamshire.

Great Northern Group.—(1) Durham and Northumberland; (2) Cumberland.

Northwestern Group.—(1) Lancashire and East Cheshire; (2) Coalbrookdale (or Shropshire); (3) Forest of Wyre.

Western Group.—(1) Bristol and Somersetshire; (2) Forest of Dean.

II. WELSH COAL FIELDS.

(1) South Wales; (2) Denbighshire and Flintshire.

III. SCOTTISH COAL FIELDS.

(1) The Clyde basin; (2) Midlothian and Haddingtonshire; (3) Fifeshire; (4) Ayrshire; (5) Lesmahagow; (6) Canonbie.

IV. IRISH COAL FIELDS.

(1) Northern Group; (2) Southern Group. These are of small importance and little worked.

The thickness of the seams worked in the fields varies from 11 or 12 inches to 30 feet, but the latter is restricted to South Staffordshire; this seam and the thick coal of Warwickshire being quite exceptionable. Cannel coal in Scotland has been worked, in some instances, when only six inches thick.

The variation in the character and quality of the coals within the different fields themselves is remarkable; for instance, first class coking coal is mined near the banks of the Tyne, yet only a few miles east of Newcastle the world-famed Wallsend household coal is produced, and by far the greater part of the Northumbrian output is exported as steam coal. Again, coke unrivalled in quality, is made from the coal mined in the western and south-western part of Durham, whereas good gas and very superior house coal is raised from the collieries situate in the central and eastern part of the same county.³ The principal steam coal-producing areas, other than Northumberland, are South Wales (pre-eminently), and parts of the Scottish fields—notably that of Fifeshire—to some extent Lancashire, North Staffordshire and Yorkshire; the other fields chiefly supplying manufacturing, iron smelting, gas and coking coals. Of all the districts, the variation in character of coal is most marked in the great South Wales field, the seams in Monmouthshire being bituminous, but toward the southwest they become less and less so, until in central Glamorganshire the fuel mined is the world-renowned smokeless steam coal so much in request by the navies of this and other nations, and toward the northwest (Carmarthenshire) the seams pass into anthracite.⁴

A factor that must largely affect the future commercial prosperity of the country, indeed is vital to it—is the duration of its iron and coal supplies. The stores of iron ore, owing to the nature of the deposits, cannot be estimated with the same degree of accuracy as is possible in the case of coal, but it may be safely prophesied that their exhaustion will long precede that of coal. Working on the figures arrived at by the late Royal Commission on Coal Supplies, the time which would be taken to exhaust the coal fields at the present rate of output may be taken as about 600 years;⁵ whether the present rate of output will be long maintained is, however, somewhat doubtful. For the last 30 years, the average increase in the output has been 2½ per cent per annum, and that of exports (including bunkers) 4½ per cent per annum, but it is highly improbable, owing to physical reasons, that these rates of increase will be long continued. Some districts,

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indeed, have already attained their maximum, and decadence has set in, as for instance in the "exposed" part of the South Stafford coal field. The developments in the new coal fields will possibly increase the total output for some years, but the Royal Commission, just alluded to, "look forward to a time, not far distant, when the rate of increase of output will be slower, to be followed by a period of stationary output, and then a gradual decline." Nor do they hold out any hope that the resources may be husbanded by the utilization of any other source of power; they are convinced "that coal is the only reliable source of power and that there is no real substitute, though there are some sources which may slightly relieve the demand for coal."¹⁸

¹ These figures are derived from the 'Mines and Quarries Statistics,' published annually in four parts by the Home Office as a Blue Book, comprising District Statistics, Part I; Labor, Part II; Output, Part III; Colonial and Foreign Statistics, Part IV.

² Final 'Report' of the Royal Commission on Coal Supplies. This commission was appointed in 1903, and published its final report in 1905.

³ The limited extent of metal mining is evidenced by the fact that only 29,504 persons were employed during the year 1904 in producing 3,246,336 tons of metalliferous minerals, *vide* Part IV. of 'Mines and Quarries Statistics.'

⁴ Book IV, Cap. 279. Clearly some process of extraction of silver from rich silver-lead ore (galena) must have been in vogue.

⁵ In the life of his father-in-law—'Vita Agricola.' Agricola in an oration to his soldiers before the battle, near the Grampians (84 A.D.) exclaims: "*Fert Britannia aurum et argentum et alia metalla, primum victoria.*"

⁶ The occurrence of gold in Great Britain and Ireland, by J. Malcolm MacLaren, B.Sc., F.G.S., in the 'Transactions' of the Institution of Mining Engineers, vol. xxv., pp. 435-508. Hence, "cassiterite," or oxide of tin, the commonest ore of that metal.

⁷ 'Tin Deposits of the World,' by Sydney Fawns, F.G.S. For a clear statement of the present position of Cornish tin mining, the articles which appeared in the Engineering Supplement of the 'Times' (Sept. 27, Oct. 18, 1905) should be consulted. Tin mining, in the strict sense of the term, probably dates from the 11th century, before that time the whole of the tin being derived from "Stream Works." In 1884 the British output of tin ore amounted to 15,117 tons of tin ore (black tin), worth about £40 a ton; the produce has year by year decreased, until during 1904 the output was only 6,742 tons, worth about £72 a ton. The price has been steadily rising, with occasional fluctuations, during 1905-06, tin being dearer now than ever recorded in the history of the world, and many old mines are being reopened in Cornwall.

⁸ Carew, Richard, of Antioine, 'Survey of Cornwall.'

⁹ William Pryce in his 'Mineralogia Cornubiensis' gives the output as 264,273 tons of copper ore during this period, averaging in price £6.14.6 per ton.

¹⁰ A Treatise on Metalliferous Mines and Mining, p. 125. Davies instances the fact, drawing his information from Hunt's 'Mineral Statistics of Great Britain and Ireland,' that in the year 1877 there were 101 copper mines at work in the kingdom, producing an aggregate of 79,252 tons of ore, valued at £317,186 7.7d; of these mines 65 were in Cornwall. The output of copper ore (and copper precipitate) during the year 1904 was only 5,465 tons, valued at the mines at £17,952.

¹¹ Pennant's 'Tour in North Wales.' The Parys Mine, in the northern corner of Anglesea, worked for a long time and in a century and a quarter returned profits estimated at over £7,000,000. The copper at present derived from the mines in this district is obtained by precipitation of the copper in the waters pumped from the mines.

¹² The output of lead ore for 1877 was 80,850 tons, valued at £1,123,952, whereas during 1904 it amounted to but 26,797 tons, valued at £206,238, to which should be added 36 tons of so-called silver ore, valued at £1,782. *Vide* 'Mines and Quarries Statistics.'

¹³ Sir Roderick Murchison, F.R.S., director of the Geological Survey of Great Britain, 'The Silurian System' (1839, p. 282). He says, "we shall find there

are few tracts of given extent in any part of the world which are veined to a greater extent."

¹⁴ 'The Iron Ores of Great Britain and Ireland,' by J. D. Kendall, F.G.S., affords much reliable and valuable information on this subject.

¹⁵ The output of ore from this mine during 1904 was 498,637 tons.

¹⁶ The figures of 1904 give a total production from all classes of mines and quarries of 13,774,282 tons, valued at £3,125,814. 'Mines and Quarries Statistics.'

¹⁷ The output of the various kinds of ore may be roughly proportioned as follows: Clay ironstone, 42 per cent of the output; black band, 12 per cent; hæmatite (red), 11 per cent; brown ore, 29 per cent.

¹⁸ The total production of slates during 1904 was 563,170 tons, valued at £1,678,726. Of this 427,730 tons were contributed by North Wales, in the proportion, roughly speaking, of three-fifths from open workings and two-fifths from mines. The Oakley Coy's mines alone produced 49,192 tons.

¹⁹ For an exhaustive and admirable history of coal mining in Great Britain, the reader cannot be referred to a more interesting and accurate record than the 'Annals of Coal Mining and the Coal Trade' (2 vols.) by R. L. Galloway.

²⁰ Grey, 'Chorographia, or a Survey of Newcastle-upon-Tyne,' published 1649.

²¹ After J. B. Simpson, M.I.C.E., *vide* Address on the 'Rise and Progress of Coal Mining' (1896), the diagram has been further extended and brought up to date thus:

	Long tons, 2,240 lbs.
In the year 1660, it was estimated by the Royal Commission on coal (reported 1871) that the output of coal was.....	2,148,000
And that in 1770 it had risen but little, being but	2,612,000
Between 1770 and 1750, however, steam was applied to draining mines, and gunpowder came to be used at underground operations, so that it was estimated that by 1750 the output had advanced considerably, being for that year	4,773,828
Later steam was applied to hoisting the coal up the shafts, and between 1760 and 1800 the development of the canal system took place, which gave a great impetus to the trade. So that for 1880 the output had increased to	10,086,300
In 1803 coal came to be used for the manufacture of gas, and in 1815 the safety-lamp was invented, which would further assist coal mining. Mr. Samuel Salt computed the output for 1816 to be.....	27,020,115
For 1845 Mr. J. R. McCulloch puts the output at	34,600,000
The introduction of steam in navigation and the development of the railway system took place shortly before and about this time.	
The (1871) Royal Commission on Coal, sometimes called the Argyll Commission, the Duke of Argyll being its chairman, calculated that in 1855, the output had risen to the considerable figure of.....	64,307,000
The first year of which we have official returns is 1860. The following figures show the increase:	
1860	84,042,698
1865	98,150,587
1870	112,875,575
1880	146,969,409
1890	181,614,288
1900	227,084,871
1905	236,111,150

²² Professor Hull's 'Coal Fields of Great Britain' (sixth edition) should be consulted by the reader interested in further pursuing this subject.

²³ The extent to which the different fields contribute to the total production may be roughly proportioned as follows:

	Million Tons.
Scotland { East Scotland	17½
{ West Scotland	1½
{ Northumberland and Durham	54½
{ Yorkshire and Lincolnshire	30
{ North and East Lancashire	11½
England { Midland	30
{ Staffordshire	14½
{ Southern District	13
Wales { Liverpool and North Wales	15½
{ South Wales	10
Ireland	under 1/10th

²⁴ The annual output of anthracite is nearly 3,000,000 tons, practically derived entirely from this region.

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* 'Reports' of Royal Commission on Coal Supplies. Final Report 1909. The Commissioners computed that there were yet remaining to be worked in the "proved" coal fields adopting 4,000 feet as the limit of practical depth in working and 1 foot as the minimum workable thickness, an available quantity of coal equal to 100,914,668,167 tons, and that the quantity supposed to exist outside the "proved" areas, i.e., in the "concealed" fields, would amount to 39,483,000,000 tons. In calculating the period of duration there has not been taken into consideration the coal existent at a depth below the 4,000 feet limit, which in the "proved" coal fields alone is placed at 5,239,433,980 tons.

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25 (a). Great Britain—The Industrial Revolution. Between the years 1770 and 1840 England became the workshop of the world. She changed radically in character; from an agricultural nation she became primarily a manufacturing one. She became dependent for her raw materials on foreign nations and on markets abroad for the sale of her goods. Her international position, therefore, was vastly affected and her prosperity became dependent on the state of trade. No less remarkable was the change in the relations of persons. A new middle class of manufacturers arose and the moneyed interest permanently overtopped the landed interest in social importance. Alongside of the employing class grew up the class of factory hands, and the business relations of the two classes had to be settled afresh and not without considerable friction. The industrial revolution involved, therefore, industrial reconstruction with all the disintegration and suffering that drastic reconstruction always causes.

Not more striking than the alteration in the character of English industry and in English social relations was the remarkable shifting which took place of centres of importance, for suddenly the North sprang into prominence and the South correspondingly declined. In this new industrial region huge masses of people were congregated on certain spots, and the problem of the large towns arose, with all the sanitary housing and other questions connected therewith.

Then came the problem of feeding these agglomerations of people and of getting rid of the goods they made, which questions were answered by the great revolution in the means of transport and the changes in the English fiscal system.

The industrial revolution is generally dated from the coming of machinery and is usually connected with the invention by Arkwright of a cotton-spinning machine in 1775 which was worked by water. It was the application of mechanical power to industry that constituted the novelty, for it was the invention of a substitute for man himself.

But events had been preparing for more than half a century for the introduction of manufacturing on a large scale in England. Inventors had always been numerous, but the conditions were present about 1770 which enabled an inventor to bring his ideas to a successful issue. In the first place there was in the England of that time an abundance of capital, owing to the development of the banking system,

so that an enterprising man could get money to try experiments. Arkwright's machine is said to have cost £12,000 before it was perfected. Then, too, there was every prospect of large sales without which machine production would have been unnecessary. England's markets were developing steadily in the 18th century both at home and abroad. At home the revolution caused by smelting iron with coal had given rise to canals to transport the fuel and the result was a general quickening of intercommunications. New centres rose up and a greater demand for goods was created. The export of English goods was steadily rising in value and there was every chance of increasing the sales if goods were cheaper. Moreover in the 18th century the capitalist employer had become prominent. There was, therefore, a class of men trained to production on a large scale. The old mercantile companies with their rules as to limited sales had lost their power to dictate as to quantities and prices and there was no hindrance on that side to the enterprising man.

Yet although these forces were all making for a great change in the methods of industry the England of 1760 was an agricultural country. The leading branch of trade was cloth; cotton goods and muslins were imported from India and re-exported; fine cotton goods could not be made in England as the warp was too weak and linen had to be used. The iron trade had been threatened with extinction owing to the lack of timber and was only just beginning to revive when coal could be utilized for smelting owing to the invention of the Darbys about 1740; but much remained to be done, and it was not until Cort's invention of a means of puddling iron in 1784 that the iron trade made great advances.

In 1760 the Duke of Bridgewater was cutting the first canal and the turnpike roads were beginning to facilitate internal travel.

The majority of the work-people were either small manufacturers who bought the wool, wove it, and disposed of the cloth themselves, or worked on commission for some big dealer. Nearly all of them had a by-employment in the shape of a small farm, while the women and children practically all over England were employed in spinning or carding. The incomes of the day were family earnings. As English cloth had almost a monopoly value the demand was steady; England grew the bulk of her own wool and was not mainly dependent on importation from abroad. The characteristic of the whole period was stability. If the orders for cloth fell off then the man had his bit of farm to fall back on — the one helped the other. Agriculture was not divorced from industry nor the workman from country employment, nor was there any marked distinction between town and country. It is probable that according to our notions the life was sordid and the standard of comfort low, and there is no reason to think that the parents were the easiest of taskmasters for the children. But the problem of the unemployed was absent, and the domestic workmen at all events decidedly preferred the life to that of the factory.

When machinery came it was curiously enough first of all applied to the languishing trade of cotton. The reason seems to have been that the supply of raw cotton was unlimited,

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while England was already on the verge of a wool famine. Sheep growing had not been started in Australia and there was no reason to anticipate that even if machinery came in the output could be largely increased. Moreover wool being more brittle than cotton it was found at first very difficult to adjust it to the strain of the machine without constant breakages. Hence wool is affected by machinery much later than cotton. Arkwright, a barber, revolutionized the cotton trade by his water frame, patented in 1775, which spun a yarn firm enough for the warp. Crompton followed this up by inventing the mule in 1775 which created the muslin trade; and Cartwright, a clergyman, brought out the power loom for weaving which was first used in 1801. Power spinning in the woollen trade did not become general till the first decade of the 19th century.

The effect of the cotton machines was to create a new trade. The great manufacturing centres had hitherto been Norwich and Devizes, but the new machinery needed water power, and hence the trade settled in the North in country districts where water was available. The first machines were small and simple and were made of wood and necessitated a good deal of bending over by grown-up persons but could easily be worked by children, but such labor was difficult to obtain in the country in large quantities, hence the massing of pauper children in these factories. There seem to have been grave abuses in the system and a new era was inaugurated by Sir Robert Peel's Health and Morals of Apprentices Act of 1802 which limited the working hours of apprentices to 12 per day.

The problem, however, was altered when steam came in owing to Watt's invention. It was only substituted gradually for water power, coming in more and more after 1815 and becoming the prevalent type altogether in 1840. The important thing now was no longer water but coal, and to get coal the factories had to settle in the great centres where coal could easily be brought by canal, as the cost of dragging it over country roads was prohibitive for cheap production. Hence we get a second great migration of industry to the towns near the coal fields. Here child labor was readily available, and a new Act had to be passed in 1819 to meet the case of children who were not apprentices. As steam became more regularly applied the machinery got more complicated and less suitable for children of tender years, and there was a tendency to discontinue them in certain branches. They were still retained in the old water mills and the Factory Acts were never really effective till the invention of the government factory inspector in 1833.

There were practically no people dispossessed by machinery in the cotton trade; instead there were increasing opportunities of employment, but other trades suffered. The demand for both light woollen and linen goods fell off as cotton was substituted. Still the weavers prospered. They continued to work up the yarn in their own homes, and it was not until the dislocation of trade brought about by the Napoleonic wars that they fell upon evil days. Gradually machinery was applied to weaving, and the race of hand-loom weavers died out amid great privations.

It was when machinery was applied to wool, that the real social upheaval came. It destroyed

the by-employment of spinning throughout the whole of the country districts, and an elaborate system of relief from the rates had to be devised to assist people over the crisis. This pauperized the whole of the south of England and degraded the agricultural laborers as a class.

The radical change in English life came from the fact that the factory system destroyed the old stability. A man had to follow his work to the towns and lost his little farm. Even when the factories were situated in the country he had to work regularly and could not take time off to attend to the garden as he could when working for himself. The regularity of the life, the tyranny of the factory bell, and the loss of independence were the things of which the worker most complained. The early factories, situated as they were in the country districts, laid the workmen open to an appalling system of payment in kind called "truck," an evil only gradually remedied by a series of Acts of Parliament beginning in 1831.

But more important than his dependence on his treatment by the master was the dependence of the workman on the state of trade. The sufferings during the Industrial Revolution in England were especially violent owing to the Continental System of Napoleon which shut out English goods from Europe except by smuggling between 1806-1812, and which was followed by the rupture with the United States, which cut off another very important market. After the peace of 1815 the utter exhaustion of the continent made Europe a bad customer, and England, equipped as she now was for production in bulk, suffered accordingly. The coming of machinery would have been a difficult time for any country, but the troubles were enormously aggravated owing to the fluctuations of trade and the depression after the war. English exports decreased in value between 1815 and 1825, and only began to recover about 1835, and to make a rapid advance in 1840. Nevertheless the increase in trade when compared with that of 1750 was enormous.

The exports in 1750 were valued at £12,699,081, in 1800 they were £34,381,617, in 1840, £116,479,678. The imports in 1750 were £7,772,039, in 1800, £28,257,781, in 1840, £67,432,964.

The growth in the import of raw cotton is very striking. In 1751, 2,976,610 pounds were imported, in 1815, 99,306,343, in 1830, 259,856,000.

The import of wool could not expand till the Australian wool became available. In 1800 the number of pounds imported was 8,609,000, in 1840, 49,436,000, in 1857, 127,390,000.

Then the English fiscal system had to be overhauled to get in cheap raw material, and the agitation of the manufacturers was successful in bringing about the free trade era.

During the 19th century the English Parliament has been mainly occupied in readjusting the relations of employers and employed, in facilitating the growth of a manufacturing state, and in abandoning the system which was made for an agricultural state; while no attempt has been made to preserve any balance between agriculture and industry.

The result of the industrial revolution in England was, to use the words of an 18th century writer, "to remove multitudes of people

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from our natural and fixed basis, land, to the artificial and fluctuating basis, trade."

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25 (b). Great Britain—The Industrial Organization. *The Recent Character of Important Changes.*—The industrial organization of the United Kingdom as it is at the present time is of recent origin so far as some of its most characteristic and important features are concerned. The "industrial revolution," so-called, which took place at the end of the 18th century, important as it was, did not extend very far, but left other countries comparatively untouched. Many British industries continued to be carried on by the old methods. Railways and the means of transport generally were ill-developed, and the old balance between agriculture and manufactures remained on the whole undisturbed. These conditions have all been altered in more recent times, especially during the last 30 years. The machine-industry has spread to other countries, and whenever a new manufacture is now founded it is carried on by methods of which Great Britain formerly had the monopoly. Moreover, the relation of manufactures to the rest of the national economy has undergone a great and fundamental change.

The Decline of Agriculture and its Effect.—In the period 1831-5, 96 per cent, or 23.6 millions, of the then population were fed from home-grown corn. In 1841-5, the period immediately preceding the repeal of the Corn Laws, while the percentage of the population fed from home-grown corn had declined to 90 per cent, the actual number had risen to 24 millions. In the period 1901-5, the percentage of the population so supported had fallen to 10.6 and the actual number to 4½ millions. The change so indicated is not confined to wheat, but extends in some degree to every form of agricultural produce, including meat, and these changes have become more marked during the last 30 years. Most of the old economic arguments, which were in fact based upon an assumed balance between agriculture and manufactures and the action and reaction of one upon the other, have ceased to be relevant to the United Kingdom. The export of

manufactures is absolutely essential to the maintenance of the United Kingdom.

The Relations between the Home and the Export Trades.—The home market, in the sense in which this expression is used in America and on the Continent of Europe, cannot be said to exist. Calculations, or to speak more accurately, "guesses," are frequently made as to the relations between the home and the export trades. It was calculated for example, a few years ago, that 20 per cent of the total wages in England was earned in productions for the export trade and in much economic reasoning at the present time, there is an implied assumption that the home trade is so much more important than the export trade that a considerable change in the character of the latter would be of no great importance. This reasoning might perhaps apply to a large extent to the United States and to a smaller extent to modern Germany: it certainly would not apply to the United Kingdom. Whatever the exact proportions may be—and until there is an industrial census we have not an adequate basis for calculation—it is certain that the relation between the home and the export trade in the United Kingdom is very different from that which is found in foreign countries and must necessarily affect both the international organization of the trade and business policy adopted. In the actual investigation of trade conditions, it is extraordinarily difficult to obtain from firms engaged in industry materials for any clear-cut distinction between the two branches of national activity, because, even in the case of firms which themselves do directly no export trade, the reaction upon their trade of trades which manufacture for export is both immediate and rapid. We may take one or two examples to show how this works out.

The Cotton Trade in Relation to Other Industries.—The Cotton trade differs from all other British industries in the proportion which the export trade bears to the home trade. More than 80 per cent of the output of the cotton industry is exported. The industry employs more than half a million working people directly in the mills, and they and their families depend directly for their livelihood on their weekly earnings. To these we must add the millions of people dependent upon the railways, the canals, the shipping which bring the raw materials to the mills, and carry away the yarn and manufactured goods; on the engineering industry which provides the machinery required; on the building trades which erect the mills, and house the operatives; on the countless other trades and agencies, state, municipal, and private, which supply the needs of the great industrial population. The result is that the prosperity or the depression of the cotton industry quickly affects other trades throughout the country, whether they do or do not manufacture for export. In the recent cotton boom the improved conditions spread over the country like a great tidal wave. Here then whether the actual proportions between the total export trade and the home trade of the country are as 1 to 5, or 1 to 6, is of trivial importance. If any considerable diminution occurred in the exports of Lancashire, or even if the export trade remained for a long period of

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time stationary, many other industries would suffer from stagnation.

The Export Trade and Domestic Competition.—Evidence recently obtained brings out another very important condition which is found in British industries at present. Here again we may in the first instance take the cotton industry. While there is no particular reason why Germany and other competing countries should not with ease and success spin coarse and medium counts both for the home and the export trades, Lancashire at the present time has almost the monopoly of fine spinning, and this branch of the spinning industry has beyond all question considerably increased in recent times; but until the boom of the last two years the depression in certain branches of the cotton trade reached alarming proportions. There was a marked tendency under these influences for capital to go into fine spinning and competition has in fact become exceedingly severe in recent years. The McKinley and Dingley tariffs prejudicially affected many important branches of the woolen industry. The result of the loss of these and other markets has been to throw manufacturers back upon the home market to such an extent, that whereas in former times the woolen industry was carried on in localities, each of which was devoted to specialties, the lines of demarkation between one locality and another are gradually being broken down. The West Riding competes with the West of England, and the different parts of the West Riding compete with each other in a far more marked degree than was formerly the case.

Textile Substitutes.—This movement has been accentuated by the invention of substitutes for different textiles. Cotton competes with linen, and in many of the cheaper classes of goods has displaced the linen. Cotton substitutes for wool have played havoc with certain branches of the woolen industry. Mercerised cotton has displaced many goods formerly made of silk. During the high price of wool in recent years cotton benefited considerably by the extended use of cotton substitutes for woolen goods. Generally speaking, three conditions fundamentally affecting the industrial organization of the United Kingdom have become more marked in recent years: (1) the old balance between agriculture and industry has been completely destroyed, with the result that the export of manufactures is of vital importance to the existence of the country; (2) the export trade in manufactures bears a higher proportion to the home trade than that of other industrial countries—in one industry, cotton, that proportion reaching more than 80 per cent of the whole; (3) the loss or relative diminution of some branches of the export trade has greatly increased domestic competition—a competition which has further been rendered more acute by the more extended use of substitutes for the various classes of textile goods.

Size of Firms.—The theoretical lines upon which economic investigation has been carried on in England have popularized a purely academic view of the industrial organization of the United Kingdom, based to a large extent on the conditions which prevail only in certain industries organized on the factory system. The

picture is presented of the great factory employing large numbers of pure wage earners, above them the class of the foreman, etc., then the great *entrepreneur* and the capital in the background, the *entrepreneur* sometimes being resolved into a board of directors with one as managing director. Moreover, this idealized factory is becoming larger and larger, swallowing up the smaller works in its progress and ultimately forming part of one great amalgamation controlling a large proportion of the industry in which it is established. This highly-organized business proceeds every year to a higher grade of manufacturing, employing a class of workpeople progressively improving in skill and intelligence, and in the wages they earn. There can be no doubt that illustrations may be found in the industrial system of Great Britain of this type of industrial organization, but it would be a great mistake to suppose that it is normal or usual. Taking the United Kingdom as a whole there are probably not more than 90,000 to 100,000 manufacturing firms, and of these the vast majority are small works. Even in iron and steel and engineering the great firm employing thousands of workpeople is by no means common. Over a great part of the Midlands countless small industries are carried on in which the prevalent type of manufacturer does not differ so widely from his predecessor of two or three generations ago as the economic textbooks would lead one to suppose. To what extent the process of concentration has gone, how far the smaller firms have been eliminated, whether that elimination is proceeding faster or slower than it did 30 years ago, whether the whole of the industrial system is growing by degrees to conform to standards very largely derived from certain industries in the United States, are questions it is impossible to answer. At present, so far from conforming to one particular type, the industries of England as they pass under review present a bewildering complexity of organization.

Tendencies with Regard to Raw and Half-Manufactured Materials.—Some important changes have taken place in regard to the conditions of supply of raw materials. It is of course impossible in this article to review these conditions as they affect all industries, but taking the case of raw cotton, the general opinion in the trade appears to be that conditions have deteriorated, both absolutely and relatively, partly because of the liability to shortage which was illustrated on a great scale in 1903 and 1904, partly because of the competition of foreign countries, and partly because English spinners cannot use all classes of cotton. The last mentioned difficulty is said to be due in a large measure to the objections of the operatives, but the change in the proportion taken by the Continent, the United States and Great Britain respectively has reacted upon general conditions. The following table shows the weekly consumption of cotton in the United Kingdom and on the Continent during this critical period.

	Great Britain.	Continent.
	(bales of 500 lbs. each)	
1901-02	62,560	93,000
1902-03	61,250	99,000
1903-04	58,020	99,000

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Thus, while Lancashire was working short time, owing to a diminished supply of 3,230 bales per week, the Continent continued with the same supply as in the previous season. The explanations given for this state of things fall into two groups, one attributing it to differences in the method of buying, the other referring it to the general policy of the countries concerned. In regard to wool, the conditions have also altered considerably within recent experience. There has been a steadily-diminishing production of British wool which is probably connected with the agricultural depression, and Continental wools have also declined in use, but there has been an enormously increased use of Australian and other Colonial wools; and in regard to the Australian wool trade in particular great changes have taken place in the organization of the trade. Not only has a direct trade of considerable proportions grown up between the Continent and Australia, displacing much of the indirect trade which formerly took place, but the Continental manufacturers are now strong competitors with the British manufacturers in raw wool at the London wool sales. In no industry is the diminution of England as the emporium for raw materials so marked as in the case of silk, the re-export trade in silk having declined from more than £3,000,000 sterling in the period 1857-64 to merely a nominal sum at the present time. Going carefully into the figures with regard to the supply of raw material for the various English trades at the present time it is not so clear that, on the whole, Great Britain under existing conditions enjoys those marked advantages which she formerly possessed, in the instances above mentioned, and in many others, experience having proved that foreign competing industries can do equally well, and in some instances, in the opinion of manufacturers, even better. Above the stage of raw material also there has been in recent years a decline in the self-sufficiency of British manufacturing industries. Steel blooms and billets formerly obtained exclusively in the United Kingdom are now often imported: in the engineering industry steel castings, forgings, and shaftings are frequently obtained from abroad instead of as in former times giving employment to workpeople in England. Industries like the tinplate trade have grown to depend, as some think, to a somewhat dangerous extent, on imported materials.

Finished Goods.—Competition has also developed in regard to finished goods with reactions of considerable importance on the organization of some British trades. In the woollen trade the home manufacture of foreign countries such as France, Russia, Germany, and the United States, which formerly imported largely from Great Britain, has enormously increased, and there has taken place a decline in those branches. There has thus been a tendency for yarns to displace manufactures, for tops to displace yarns, and for raw wool to be exported in a larger proportion than was formerly the case. This process, if it continues, must have a considerable effect in deteriorating the quality of labor employed in the woollen industry. The highest paid and most efficient labor is in the finishing branches, and if these

branches are displaced and inferior grades substituted, there must inevitably take place a gradual degradation both of the quality and the wages of labor.

Tendency to Specialties.—On the whole, however, the effect of the increase of foreign competition on the industries of Great Britain has been to produce a growing tendency toward the manufacture of specialties. Large generalizations in regard to an industry are scarcely ever correct, but it we may make one for the purpose of bringing out this point, we might say that while in the United States and Germany the tendency has been to capture certain staple lines, to rely for the maintenance and growth of production of these lines chiefly upon the home market, and to support the system so established by an export organization for the disposal of surplus products, the tendency in some great English industries, especially the textile, has been more and more in the direction of specialties. This condition affects fundamentally the organization of the British industrial system, because it is less possible to make to stock or to diminish the burdens of fixed charges; greater attention must also be devoted to watching the ever-changing character of the demand; greater expense must be devoted to designing and processes, and it is less easy to scrap old machinery. Thus the industries of England are probably less homogeneous than those of the competing countries. The cotton trade, big as it is, is not one industry, but a vast aggregate of industries in which it is scarcely possible to find two mills which are strictly comparable. There is not merely the distinction between fine, medium, and coarse spinning, but the range of counts produced differs from one mill to another. When we come to the weaving and finishing branches, every mill appears to have its own specialty, the spinning, weaving and finishing are not normally found conducted under the same roof, and manufacturers who cover all the different branches are comparatively rare. This, however, is not true of the linen trade, where the largest firms conduct every operation from the stage of raw material to the finished product.

Variations of Costs.—The problem of comparative costs in the United Kingdom and foreign countries is one of extraordinary difficulty and complexity; even in such grades of manufacture as pig iron and steel billets and blooms the variation in the amount and proportions of the different elements of cost are very great. Taking, for example, the actual figures of an iron and steel firm and comparing their costs in the production of steel for two consecutive periods, the works running three quarter time in the one period while they were running full time in the second period, the saving in the second period as compared with the first worked out at almost 6s. a ton, or in the case of this particular firm about £45,000 a year. Moreover, the saving was effected both on wages, fuel, and general charges, and the proportions of each element varied. Other instances showing even greater variations could be given in the same industries. These figures vitiate comparisons of the productive power of one country with that of another based upon

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average costs which pay no regard to output, the period during which the works have been running, or the trade policy adopted by manufacturers. But when we come to the different stages of production in the engineering or the textile industries, the problem is infinitely more complicated than in iron and steel because we have to consider not only the element of continuous running—the main factor in the iron and steel variations given above—but the different part played by the cost of materials and the quantity and character of the labor employed. Actual accounts are given by Lancashire manufacturers of the variations in salaries and wages from 14 to 63½ per cent in cotton spinning. Taking two mills spinning the same fine counts of cotton in France and England respectively, we find wages working out at 64 per cent in France against 70 per cent in England; fixed charges at 7½ per cent in France as compared with 4 per cent in England; working expenses at 28½ per cent in France as compared with 26 per cent in England. But this does not altogether show the matter correctly because although in the case of these particular mills the individual wages are smaller in France than in England, yet more work-people are required in France for the same amount of work, and the wage bill in France is as a total very similar to that in England though the percentages are so different. Taking another instance from worsted manufacture, the analyses of the actual accounts of a large mill come out as follows: In the wool merchandising, wages worked out at 6 per cent of the cost; in the top making 6.9 per cent; in the yarn spinning 13.8 per cent; in the cloth weaving 30 per cent. But the various items, taking the English industry as a whole, vary so considerably that it is quite impossible to reduce the comparison of costs in England and in foreign countries to useful statistical treatment.

Continuous Running.—But in every industry without exception we constantly find the same argument insisted upon as to the importance of continuous running in diminishing costs. Taking this condition of successful competition in conjunction with the tendencies which have been explained toward the loss of staple lines, and the dependence upon specialties, it is at any rate open to discussion how far the changing character of British industry is favorable to the permanent retention of the markets upon which they have hitherto depended, as other countries which have already securely established their staple lines become more and more skilled in the production of articles which compete, directly or indirectly, with the specialties of Great Britain.

The Efficiency of Labor.—Generally speaking, inquiry does not give much support to the belief, which is very widely held, that labor in England is less efficient than that of foreign countries. On the whole the evidence points to the opposite conclusion, but it does appear doubtful whether the progressive increase in wages and the diminution in the hours of labor are, as a matter of fact, followed by a proportionate increase in the productive power of the industries affected. In particular, the relative shortness of the hours in the United Kingdom does appear to handicap British industry by making it extremely difficult or impossible to get so much out of the machinery and plant, and to proportionately reduce the burden of fixed charges. It is not a question of the working capacity or the intelligence of the individual employee or of groups of employees in the same grade, but of the running of the works as an organic whole. Hence, there appears to be, under existing conditions, a growing divergence between the claims of legislation and the interests of the workers as citizens and the need of making full use of modern machinery and plant if costs are to be kept within the limits necessary for successful competition in neutral markets, or even for retaining control of the home market.

Transport and Export Organization in Relation to British Industries.—To this may be added the complications that arise in relation to the organization of British industries through the different relations between each trade and the transport system in England as compared with Germany, the United States, or other foreign countries. The United States is full of examples in which the industry at every stage, from the raw material to the finished product, works in the closest harmony with the transport and general export organization which that industry requires, and the development of the state railways in Germany and the inclusion of transport in the general scheme of national policy, produce similar results. In the United Kingdom on the other hand, railways, steamship companies, commercial organization, and all the other aids to productive enterprise have grown up historically on their own lines, and the whole national system in England is on an "individualist" basis. One of the most interesting problems which the future will perhaps solve is, how far an industry so organized can satisfy the claims of labor at home and at the same time meet on equal terms the disciplined industrial armies of competing countries.

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INDUSTRIAL REORGANIZATION.

26. Great Britain—Trade Unionism. English Trade Unionism is an indigenous product, which has remained singularly uninfluenced by any foreign movements or ideas. Disregarding the analogous combinations among journeymen during the Middle Ages, which in England seem to have been usually intermittent and temporary,

and also the mediæval guilds of master-craftsmen and merchants—between which and modern Trade Unionism no actual affiliation or connection has yet been traced—we may say that Trade Unionism, in the sense of durable combinations of wage earners for the purpose of maintaining or improving the conditions of

their employment, have existed continuously from the end of the 17th century. The earliest actual records known to us of such a combination is that of the woolen workers of the south-west of England, which is mentioned as existing in 1700, and frequently referred to in Devonshire, Somerset, Wiltshire, and Gloucestershire throughout the 18th century. The London tailors, too, can be shown to have been in continuous combination from at least 1720, when an Act of Parliament was passed to restrain them. Other Trade Unions known to have existed in the first half of the 18th century were those of the woolcombers, woolstaplers and silkweavers. It was, however, apparently during the last quarter of the 18th century, when industrial conditions were being revolutionized in so many trades by the introduction of machinery, the factory system, production for export and the use of water or steam power, that Trade Unionism first became widely prevalent. Since that date, it is notable that the aggregate membership of Trade Unions in the United Kingdom has, with a number of temporary suspensions, persistently increased, until it now (1907) approaches 2,000,000; organized in 1,150 different societies, possessing funds exceeding £5,000,000. As an institution Trade Unionism has, during the whole two centuries, and especially since 1824, when the first legalising statute was passed, steadily increased in solidity, and continuously improved in its temper toward society and in the economic character of the methods employed to gain its end. In all these respects the improvement during the last 30 years has been most marked. Whatever may be the causal connection, if any, the historian cannot but record the fact that the character of English Trade Unionism has varied from decade to decade in close correspondence with the variations of the treatment which the community accorded to it. So rapidly and certainly has an improvement in English Trade Unionism followed upon measures of legalization and tolerance that were it not that it would seem to palliate inexcusable outrages of past times, we should be tempted to the epigram that each generation of citizens and the employers in each trade in each generation have the Trade Unionism that they deserve!

The form which Trade Unionism takes among the English wage earners (and we may ignore for present purposes the Trade Unionism of other classes, such as lawyers, doctors, teachers, etc.), is that of a voluntary association among the persons engaged in a particular trade, based upon the payment of weekly contributions — varying from two pence to eighteen pence — to a common fund which is administered by an elected executive, bound by an elaborate code of rules, and controlled by frequent referendum votes of the entire membership, in such ways as are believed to promote the objects of the members. These objects are, first and foremost, the maintenance and progressive improvement of the conditions of employment of the wage earners in the trade concerned, including not only the amount of wages, but also the method of remuneration, the form of the agreement, the hours of labor, the sanitation, safety and comfort of the operatives, and all the other conditions, explicit or implicit, of the wage-con-

tract. Auxiliary to this fundamental object, and always subordinate to it, are the various "friendly benefits" afforded to members, which may include maintenance payments to members out of work, whether from strikes or lockouts, or merely from slackness of trade; sick pay; medical attendance; funeral benefit on death of member or member's wife; accident benefit; insurance of tools against loss by fire or otherwise; legal assistance to members in litigation, and so forth. It is especially in the durability and financial solidity of the association, the multiplicity and amount of their friendly benefits, and the magnitude of their accumulated funds, that the principal English Trade Unions surpass those of all other countries. There are great Trade Unions (such as the Amalgamated Society of Engineers) which habitually enjoy an annual income of £4 per member; there are others (such as the Amalgamated Cotton Spinners) which possess accumulated funds exceeding £21 per member; there are others, again (such as the Boilermakers), which disburse on sick pay and medical attendance alone, more than £60,000 a year, including no less than £8,000 as salaries to the doctors in their employment. Among them all, the Trade Unions expend more than £250,000 annually in pensions of 5 to 10 shillings a week to their aged members, and nearly £100,000 in payment of their funerals; while £750,000 is annually paid to members out of work, only from one-sixth to two-fifths of this, according to the state of the labor market, being for anything that can be called strikes or industrial disputes. But this strong financial position and these substantial friendly benefits are confined to the well-known leading Trade Unions. Out of the 1,150 separate Trade Unions, there are 20 owning more than £50,000, which together possess one-third of the aggregate total of members and three-fifths of the accumulated funds of the whole movement.

The fundamental principle of English Trade Unionism is the necessity, in modern industrial and social conditions, for the establishment and enforcement of a common rule, with regard to the conditions of employment. Without the enforcement of such a common rule, Trade Unionists assert that the operation of competition is inevitably to degrade the conditions of employment irrespective of the profitability of the industry or the wealth of the country as a whole; eventually forcing down the remuneration of the lowest and weakest wage earner to the very minimum on which he can manage to exist from day to day (far below the level for healthy subsistence); requiring him to labor for excessive hours, and exposing him to unsanitary, dangerous and brutalizing conditions of employment. Toward such a morass of "sweating," demoralizing to the workers themselves, and economically as well as socially disastrous to the community as a whole, the unrestricted competition of the labor market is always forcing out only the weaker members, but also, through the competition of these, the entire wage earning class. In confirmation of this analysis, the English Trade Unionists point to the state of millions of workers in every industrial country, the United States and Australia affording quite as striking demonstrations as England and

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continent of Europe. Its essential accuracy is, indeed, now asserted by the economists of today, and mathematically demonstrated (consult 'Industrial Democracy,' by S. and B. Webb, 1902).

Against this persistent tendency of industrial competition in the labor market, the modern economist or statesman establishes, in the interest of the community as a whole, the Common Rule of standard minimum conditions, designed to prevent the wage earner being subjected, even with his own consent, to conditions of employment likely to impair his health, undermine his strength, or demoralize himself or his family. This is the philosophy of Factory Legislation, as yet only imperfectly applied in any country, but advancing in all; as yet restricted in the main to women and children, and to their hours and sanitation, but now slowly extending to wages and other conditions, and to adult men. The maintaining, extending and enforcing of Factory Legislation is one of the principal expedients used by English Trade Unionists (especially the textile operatives, the coal miners, the railway workers and the shop assistants) for obtaining the protection of the Common Rule. Such legislation has been carried to its fullest extent at present in New Zealand and Australia. (Consult 'State Experiments in Australia and New Zealand' by W. P. Reeves).

The second expedient used by English Trade Unionists is that of Collective Bargaining. Instead of each wage earner making his own bargain with the individual employer, the Trade Union aims at making common terms for the operatives as a whole, with the whole of the employers. Examples of such Collective Bargains are the "Working Rules" which govern the building trades in nearly every English city; the elaborate hierarchy of agreements of the iron-shipbuilding trade; or the highly evolved lists of prices of the cotton industry. This does not mean (as often ignorantly asserted) that Trade Unionism implies, or that Trade Unionists desire, that all workers should be paid alike. The mere fact that a large majority of the English Trade Unionists (including the strongest and ablest of them all) absolutely insist on piecework as the very basis of their Collective Bargains, and would instantly strike against any attempt to introduce wages by the hour or by the day, proves that equality of earnings is not their object. What they do aim at is equality in the rate of pay for a given unit of work; though even here their aim is only to secure for every worker the standard rate for the work done as a minimum. No objection is made to more than the minimum rate being given, provided that this is not done in such a way as to bring other workers below the minimum. Collective Bargaining, more or less universal throughout the trade, is now the prevalent practice in all the principal manufacturing industries of Great Britain and it is, to the economist, a notable fact that it prevails most universally and is most strictly enforced, just in those industries, such as cotton spinning and shipbuilding, in which British industrial supremacy is most demonstrable.

The third expedient of English Trade Unionism is Mutual Insurance. By bringing to the support of the individual workman, in

any time of economic weakness, the aid of accumulated funds, he is enabled to stand out against the terms offered by the employer, and wait until better terms are conceded. It is with this object, and not primarily from any compassionate or humanitarian feeling, that English Trade Unionists have so generally united the well known "friendly benefits" with their trade combination. The large accumulated funds of some of the English Trade Unions, amounting sometimes to £25 per head of membership, afford valuable assistance in their Collective Bargaining for better conditions, by making possible the final arbitrament of the strike. But they do more than that. In small and closely unit trades, where the operatives are sufficiently self-restrained and intelligent, what we have called the strike in detail may be an effective weapon. There is no overt Trade Unionism. The employer may refuse to recognize the Union, or the law may make corporate action dangerous. There may even be no attempt to prevent the employer filling his vacancies. But if the men in the trade are strongly combined, the employer may find that he cannot keep any man more than a week or two. Each man in succession leaves in silence before he has well settled down to his work, leaving the employer to find out for himself in what way the conditions which he is offering offend against the undivulged Common Rule. Such a strike in detail is out of the power of any but a small, skilled, strongly combined, highly intelligent, and rich Trade Union having an elaborate Mutual Insurance. But with such a Union experience shows it to have often been more efficacious in maintaining the Common Rule, than the most turbulent of strikes.

The English Trade Unions form, with the analogous associations into which the employers in the principal trades are now brigaded, elaborate organizations—based on mutual discussions in joint committees, investigation by neutral accountants and the joint application of principles by the salaried officers of the employers and of the workmen respectively—for Collective Bargaining, the settlement of standard piecework lists, scales of wages, and other general minima of the conditions of employment to be observed throughout the trade; for the application of these formal agreements to the varying circumstances of particular districts, particular establishments, particular branches of work, and even particular jobs; and also for the revision of these general agreements, and the settlement by arbitration of the disputes that from time to time inevitably arise. This elaborate machinery for determining, irrespective of the will or caprice of individual employers or individual operatives, the minimum conditions on which the whole trade shall work, is most highly organized in the cotton manufacturing, coal mining and shipbuilding industries, together with some smaller trades, such as the brassworkers, lacemakers, and compositors.

The Trade Unions have, however, further organizations of their own. The local branches in each town are united for mutual support in Trade Councils, of which there are now over 200. These organizations are of little financial strength, and chiefly of moral support. More substantial are the great federations, of which

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the principal one, the General Federation of Trade Unions, now includes over 90 large Trade Unions, with 400,000 members, and an accumulated fund of £100,000. This has for its object the mutual support of its constituent unions in industrial disputes. Another federal body, the Federation of Engineering and Ship-building Trades, with 350,000 members (including most of those in the General Federation), has for its principal object, the prevention and settlement of the disastrous disputes that occasionally break out between one set of workmen and another as to the "encroachments" by one trade on another, and the proper "demarcation" of their several pieces of work. A third body, the Miners' Federation, is composed of practically all the coal mining Trade Unions, and has, beyond mutual support, principally for its object the obtaining of additional Mines Regulation Acts, especially the enactment of an eight hour law.

The relative proportion which Trade Unionship members in the United Kingdom bears to the wage earners as a whole, is often much misunderstood. The two millions of Trade Unionists amount to only one in seven of the whole. What is, however, obscured by the statement is that the vast mass of the wage earners belong to occupations in which Trade Unionism does not exist, or exists only in rudimentary form — such, for instance, as the agricultural laborers, the unskilled laborers in urban districts and the domestic servants, or the large numbers who work in one or other form as independent producers, such as the jobbing craftsmen, the tin and copper mines, the homeworking seamstresses, etc. Women workers, generally, including all the factory population, count only 125,000 Trade Unionists out of some four millions of women industrially employed. A more correct way to estimate the strength of Trade Unionism is to take the proportion of Trade Union membership to the adult males employed at wages in particular industries. In many cases, such as the boiler-makers, the cotton spinners, the lacemakers, and the coal miners, it would be found that over whole districts of England every operative actually employed was a Trade Unionist. In such industries, indeed, Trade Unionism is as universally compulsory as citizenship, and is enforced by as little conscious pressure. It is taken for granted by every workman, as it is by every employer. The whole industrial organization is adjusted to it, with the result that it becomes as imperceptible as the weight of the atmosphere. On the other hand, there are great industries, such as the building and engineering trades, in which, while strong Trade Unions exist, are whole districts in which a majority of the workmen remain outside the unions, not caring to pay the weekly dues; and usually in every town some establishments which employ indifferently both Unionists and non-Unionists. To the economist it is significant that it is precisely in those industries in which Trade Unionism is virtually universal and compulsory — among them being particularly cotton spinning and shipbuilding — that both technical processes and the use of machinery have been most advanced, and both industrial efficiency and financial success have been most conspicuous.

In contrast stand the "sweated" industries, low grade in quality in their nature, and curiously unstable in their position in the world-market. In these industries neither Trade Unionism nor effective Factory Legislation exists.

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SIDNEY AND BEATRICE WEBB,
Joint authors of 'The History of Trade Unionism'; 'Industrial Democracy'; 'Problems of Modern Industry.'

27. Great Britain — The Labor Movement in Politics. The greatest politician of the last century, W. E. Gladstone (q.v.), writing in 1892, expressed the opinion that "The labor question may be said to have come into public view simultaneously with the repeal of the Combination Laws," — that is about 1825.

Accepting this authority, we may divide the 80 years that have since elapsed into three periods, dominated not as might be expected by three but by two ideas. From 1825 to about 1850, labor, when it fought at all, fought under its own flag, and disdained alliance with any other party. From 1850 to 1900, partly owing to the dominating personality of Mr. Gladstone, political labor for the most part joined hands with Liberalism. In 1900 the banner of independence was raised once more, and has already attracted the greater part of the political forces of the proletariat.

The First Period of Revolt.—Up to 1832 the Government of England was an irregular oligarchy rather than a democracy. The House of Commons which then as now exercised supreme control, was elected in a haphazard fashion. A few members represented large democratic constituencies; many were elected by some scores or hundreds of voters; many others were practically nominees of individual landowners or of the Crown. Labor scarcely aspired to political rights; all it asked was relief from coercive legislation and excessive taxation. The populace, of course, supported the reformers of 1820-32, and it was fear of revolution which forced the House of Lords to consent to the passage of the Reform Bill.

Nearly the first work of the reformed Parliament of 1832 was the amendment of the old Poor Law, which had reduced the agricultural laborers of southern England almost to the condition of serfs, owned not by individuals, but by their parishes. The abolition in 1834

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of the system of indiscriminate outrelief was intensely unpopular, and this, combined with the memories of the recent reform agitation, and with the teachings of Robert Owen (q.v.), who had promulgated many of the doctrines of modern Socialism, led to the Chartist movement, the first distinctively working class political agitation in modern England. (See CHARTISM.)

"The People's Charter," drafted by Francis Place, the radical tailor, was issued in 1838. Its six points were universal (*i. e.* manhood), suffrage, election by ballot, payment of members, annual parliaments, equal electoral districts, and the abolition of property qualification for members. This purely political programme gathered to itself the whole of the working class discontent which hitherto had taken other forms. In 1839 the north of England was saved from a revolutionary rising by the ability of Sir Charles Napier; and Chartism was crushed by the imprisonment of its leaders. It survived till 1848, when the continental revolutions fanned it again into flame, but it expired after the failure of a monster meeting at Kennington, London, which was to inaugurate the British revolution. Meanwhile the agitation for the abolition of the Corn Laws, which was successful in 1846, had attracted to the Liberal party a great measure of labor support, and with the disappearance of Chartism, the first period of revolt terminated.

Labor in Alliance with Liberalism.—The abolition of the Corn Laws was followed by a series of years of expanding trade and growing wealth; the narrow Whig oligarchy was gradually replaced by a broader Liberalism which conferred the suffrage on the workmen of the towns in 1867, and on those of the rule districts in 1884. John Bright (q.v.), the tribune of the people, and Joseph Chamberlain (q.v.), the idol of radical Birmingham, were the real leaders of the working classes up to 1886, and Gladstone generally held their allegiance from 1868 till his retirement in 1894. The trade unions had during this period established themselves as national institutions, and the standing Parliamentary committee of their annual conference was in constant friendly communication with Sir William Harcourt (q.v.), Sir Henry James (now Lord James) (q.v.), A. J. Mundella, and other leading Liberals. George Odger was one of the first working-class aspirants to Parliament, but he died before the day of victory. In 1874, Thomas Burt (q.v.), the Northumberland miner, was elected for Morpeth, a position he still retains, and his remarkable career has been honored in his old age by the high dignity of a seat in the Privy Council. In the same election another Labor candidate, Alexander Macdonald, was successful. At first the Liberals opposed these upstarts; but their claims were soon admitted, while their harmless respectability and valuable special knowledge were generally acknowledged. In 1880-83 trade unionists were elected; in 1885, 11; in 1886, 9; in 1892, 15; in 1895, 12; while 3 more were successful at bye-elections between this date and 1900. Meanwhile Henry Broadhurst, a stone-mason, was appointed Parliamentary Under-Secretary

of State for Home Affairs in 1886, and Thomas Burt, a miner, was Parliamentary Secretary to the Board of Trade from 1892 to 1895.

It may be said that almost all these men were elected as Liberals. The distinction between them and the others of their party was that they had been manual workers, they had entered Parliament as nominees of their fellow workmen, and usually their election expenses were paid and their maintenance was provided by the funds of their trade unions. But in fact the classification, though definite, is not determined by any one factor. Working men were elected during this period in considerable numbers to town councils, school boards, county councils, and other local governing authorities, and many were appointed justices of the peace, that is members of the unpaid courts of first instance.

The New Revolt.—The origin of the revival of independence in politics dates from 1884, when the modern Socialist movement began in England. In this year the Social Democratic Federation, founded a short time before by H. M. Hyndman, became distinctively socialist, and the adhesion to its ranks of William Morris (q.v.), the poet and artist, brought it into immediate prominence. Several Socialist candidates were put in the field at the election of 1885, but they all failed to secure more than a few dozen votes, except John Burns (q.v.), now President of the Local Government Board, who polled 598 votes at Nottingham, but, of course, was defeated.

From this time onwards the Socialist party made slow but steady progress. The Fabian Society, founded also in 1884, devoted itself to adapting the principles of socialism to English political conditions, and in 1893 J. Keir Hardie (q.v.) (Ayrshire Miners), who had been elected to Parliament for West Ham, near London, the year before, founded the Independent Labor Party, a socialist body whose object was to promulgate a form of socialism more acceptable to British trade unionists than the doctrinaire and revolutionary gospel according to Marx, which was then expounded by the Social Democrats.

Here we must turn aside to make one point clear. The Independent Labor Party (commonly called the I. L. P.) is a small, though influential, socialistic body, which has never numbered more than some 15,000 members. It must be carefully distinguished from the Labor Party which is before all things independent, as well as from the Labor Party in its wider sense. This important distinction is constantly neglected even in the best-informed London press.

During the fifteen years prior to 1899 the Socialist societies kept up a constant agitation for the direct and independent representation of labor in Parliament, with a certain measure of success. John Burns was elected in 1892 for Battersea as an independent attached to no party. Keir Hardie, after his election, carried his independence even further, but lost his seat in 1895, and was not re-elected till 1900. Meanwhile the trade unions had been gradually permeated with the new spirit, and in the autumn of 1899 at their Plymouth conference, a resolu-

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tion was carried instructing their executive to call a conference of trade unions and Socialist societies in order to form a new body for the promotion of labor representation. This conference met in London in February 1900, and the Labor Representation Committee was then founded with a membership (at the close of the first year) of 376,000, of whom less than 23,000 were Socialists and the rest trade unionists.

The new body (which in 1906 altered its name to the Labor Party) consisted of a federation of trade unions, trades councils (that is the local organization of trade unionists in each town), and the three Socialist societies, of which, as previously mentioned, the Independent Labor Party is one. The Social Democrats, however, withdrew a year or two later. At the general election of 1900, the Labor Representation Committee, as it was then called, put 15 candidates into the field, but it was only a few months old; the Conservative Party, asking a vote of confidence from the country while the South African war was in progress, won an overwhelming victory, and the Labor Party was not ill-pleased to score two wins, Keir Hardie at Merthyr and Richard Bell at Derby. During the next five years it won three sensational bye-elections, but Mr. Bell dropped out, and at the dissolution the new party numbered four. Mr. Bell's defection was due to a change in the policy of the body. It was first formed to create a "group"; it was determined that candidates supported by the Labor Representation Committee might ally themselves on other questions with the existing parties; that independence should be limited to labor questions alone. Against this policy a constant internal struggle went on till the Newcastle conference of February 1903, when the extremists won an overwhelming victory, and thenceforward the watchword was complete independence of all other political parties.

There are two chief reasons for this policy. One, of course, is distrust of the Liberal Party which is largely middle-class, controlled by wealth, and in league with a section of the aristocracy. It is not necessary to discuss how far this distrust is well founded, because it is undeniable that the Liberal Party, as at present constituted, must consider other interests as well as those of the workers. The other reason is more cogent. If labor makes any political alliance it must be with the Liberals. Once indeed the secretary of the cotton-operatives was a Tory candidate for Oldham, but he lost the seat for his party, and he is the only exception to the otherwise unbroken rule that labor alliance means alliance with Liberalism. But very many trade unionists, especially in Lancashire, are Conservative, or at any rate are strongly anti-Liberal, and they would not be content to see their contributions to their unions invariably used in the interests of their political opponents. In fact it was the accession of 103,000 textile operatives that at the Newcastle conference turned the scale decisively for independence. Five years were spent in active preparation, and the long-expected election of 1906 found the Labor Party

ready for the fight. It put 50 candidates into the field, and elected 29 of them. After the election another joined their ranks, and for the first time in British history the workers of the country were represented by a compact independent party in the House of Commons. No aspect of the election attracted more attention at the time, and in the few months since the new party has fully justified itself, by the activity and political ability of its members, and their success in moulding the policy of the Liberal government.

Political Labor in 1906.—Having traced the history of the participation of Labor in politics, we shall conclude with a survey of its present position, which will reveal an extraordinary complexity of organization, and a considerable diversity of ideas.

The most dramatic result of the Liberal victory was the appointment of John Burns, engineer, socialist, and trade unionist, to a seat in the Cabinet as President of the Local Government Board, which carries with it membership of the Privy Council. The appointment was fully expected. John Burns was too powerful a force to be left outside, and he can rightly claim that he entered the Cabinet as a direct representative of labor. He is still a member of his trade union, and until his salary as a minister began to run, he was largely maintained by grants from his own and other unions. As member of Parliament for Battersea Mr. Burns was never distinctly a Liberal: he stood as John Burns. His appointment was the most popular act of the government which took office immediately before the election, and for a time John Burns himself was the most conspicuous man in England.

The representatives of labor in the present parliament belong to three distinct groups: (1) The Labor Party proper, the group of 30 men who sit in opposition to the Government, and act in complete isolation; (2) the Miners, of whom there are 13 (besides one or two in the Labor Party), some of whom were elected as Liberals, some as miners simply, who in a few cases fought and beat the official Liberal; (3) the Liberal-Labor men who numbered 11 at the election, but who have since been reduced to 10 by the retirement of Mr. Broadhurst. The Miners and the Liberal-Labor men form a group within the Liberal Party, and a number of advanced radicals usually co-operate with them.

Outside Parliament there are three great working class organizations: (1) The Parliamentary Committee of the Trade Union Congress, which is the largest and traditionally most important of the three, though its functions have now been largely usurped by the younger bodies; (2) the Federation of Trade Unions, formed to organize a common fund for strike purposes, which takes but little part in politics; and (3) the Labor Party, which exists for politics alone. Joint committees of these three bodies have frequently been formed for special purposes; a joint board now exists to promote co-operation, and the same set of men form the executives, sitting sometimes on one, sometimes on

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another, and sometimes even on two of the committees.

The Labor Party consists first of the 30 members of Parliament. These men are required by the rules of their party to stand as labor candidates only. In fact about 23 are members of socialist societies, chiefly the Independent Labor Party. The Labor Party organization which finances these candidates consists of 158 trade unions with 904,496 members, two socialist societies with 14,730 members, and 73 trade councils whose membership owing to overlapping cannot be counted. Except for the Miners, who are scarcely represented, the whole of the English trade unions may be said to belong to the party. Its funds are provided by a payment of 15/- per 1,000 members, for working expenses, and one penny a member (likely to be increased to 2d.) for the Parliamentary Fund, out of which the 29 members elected under its auspices are paid £200 a year, with a small contribution toward election expenses.

The body holds an annual conference which has exclusive power to alter rules and determine policy. This conference elects the executive committee of 13, of whom nine are chosen by the trade unions, one by the trade councils, and three by the Socialists. It will be noted that Socialists who only contribute one-sixtieth of the funds and only possess the same proportion of the voting power at the conference are accorded three-thirteenths of the executive committee, while the Secretary, J. Ramsay Macdonald, M.P., also belongs to their party. This arrangement, deliberately maintained at the conference of 1905, after keen debate, is a tribute by the trade unionists to the political importance of Socialism. Every organization affiliated to the Labor Party can put forward its own candidates if it undertakes to provide their election expenses, and, if successful, the member is paid by the party. The 50 candidates who stood in 1906 were put forward partly by the trade unions and partly by the Independent Labor Party; the Fabian Society does not collectively run candidates, though many of its members stood and seven were elected. Of the Social Democrats only one, who stood as a Labor candidate nominated by the dock laborers, was elected.

The Socialist wing of the labor movement is represented by three national societies, the oldest and most orthodox or doctrinaire of which is the Social Democratic Federation. It claims about 10,000 members, and has done much to influence public opinion. The Independent Labor Party claims about 14,000 members and has about 19 members in the House of Commons. It is very influential because it has always striven to work in harmony with the trade unions; its members not only fill trade union Parliamentary seats but all other offices as well, both in voluntary and local governmental organizations. The third socialist society is the Fabian Society, a body with under 1,000 members, mainly middle-class. It may roughly be called an association of leaders. It does not aim at a large membership and devotes itself to education, and the formulation of socialist policy. It has eight members of Parliament, some Liberal, some Liberal-Labor,

some Labor, and some both Labor and Independent Labor Party.

The political aims of labor are very indefinite. All are united on demanding such reform of the law relating to trade unions as will undo the recent legal decisions ("Taff Vale" and others) which have destroyed the security of their funds. As their bill will probably soon become law, an exact exposition of their grievances is unnecessary. These hostile legal decisions contributed largely to the success of the movement for political independence amongst trade unionists. Otherwise, the members of the Liberal-Labor section, including the miners, vary in the complexion of their opinions as do the others of their party; a few are individualists, many are Socialists, in their leanings; some are extreme and others are moderate in their radicalism.

The Labor Party itself includes men of divergent opinions, though to a less extent than the others. About three-quarters of its members are Socialists. The remaining quarter declines so to label itself, but it has no definite creed, and constant association with men of strong opinions, who as a rule have studied political and social problems, makes it to say the least, extremely tolerant of socialism.

Because of this divergence the Labor Party has refused to formulate a programme. It has issued official leaflets in favor of Old Age Pensions, and of the nationalization of railways and of land. It has advocated state provision of work for the unemployed and of meals for underfed school children; and it strongly supports free trade, a policy on which all sections of labor are united. The attitude of the Labor Party to the Liberal Government again is conditioned by various factors. The party exists by independence, but none the less it was elected largely by Liberal votes. Only five of the 29 members were opposed by Liberals. In 16 cases the Liberals left them alone to fight the Tories. In eight other cases of two-membered constituencies, the Liberals only put up one candidate. Thus 24 out of the 29 Labor men polled the bulk of the Liberal vote in their constituencies.

The Socialist political policy includes the labor policy above indicated, and goes farther on the same lines. It advocates the municipalization of the liquor trade, and more drastic interference with the evil results of competition, such as long hours and overtime, child labor, and sweating of women's labor; it favors compulsory arbitration to replace strikes and lock-outs; and a more vigorous extension of the sphere of municipal and governmental industry. Some Labor men oppose some of these proposals. Very few would oppose them all.

At present the prospects of the Labor Party are bright. Its leaders are united and harmonious. The party is in a stronger financial position than any other section, since its members are paid a regular salary from a central fund. Moreover the party has made a name for itself; it is a force to be reckoned with; its action is watched, and its intentions discussed in advance. In every respect the Labor Party member has a

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marked advantage over his Liberal-Labor rival. There is every prospect that the Labor Party will grow stronger and no doubt before long the half million miners with their 11 members of Parliament will join its ranks.

Prophecy in politics is peculiarly risky but it is fairly safe to say that the share of labor in the control of the destinies of the Empire will be larger in the future than it has been in the past.

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28. Great Britain—The Co-operative Movement. The earliest examples of co-operative institutions are the corn mills and baking societies started in the closing years of the 18th century and the first decade of the 19th as a relief from the millers' monopoly and the exorbitant price of flour. At Hull, Whitby, Sheerness, Devonport, and sundry places in Scotland, mills and bakeries were worked successfully on a ready-money, cost-price basis, but they had little effect on the subsequent movement, though Sheerness and a few other societies still exist. The co-operative idea, as we know it, was evoked in the mind of Robert Owen by consideration of the antagonism of classes produced by the industrial revolution with its widespread misery among the factory operatives. Failing to persuade his fellow manufacturers to follow his example of humane treatment of his employees, and failing to obtain efficient factory legislation from the government, he devised the plan of organizing the workers into self-sufficient communities, owning and cultivating the land in common and producing commodities for their own use or for exchange with other communities. Two such colonies, at Orbiston in Lanarkshire (1826) and at Ralahine in Ireland (1830-4), nearly succeeded. His followers, who enthusiastically adopted his communist doctrines, started, from 1828 onwards, numerous associations for co-operative trading, which employed their profits in setting their members to work at manufacture on a small scale. To provide a market for the goods so made, Owen in 1832 opened his Equitable Labor Exchange at Gray's Inn in London, where persons leaving

goods for sale received in exchange labor-notes based on the average time of production at sixpence per hour. In 1830 there were nearly 300 "Union Shops" with over 20,000 members, and between 1830 and 1835 seven Co-operative Congresses were held. But by 1835 the whole movement collapsed owing to want of legal status, the divergent interests of the members, and the failure of the labor-time principle. The enthusiasm of Owen's followers now overflowed into the Chartist movement.

The second stage in the history of co-operation began in 1844 with the founding of the Rochdale Society of Equitable Pioneers by a group of socialists, chartists, and trade unionists, who found the motive in the failure of a strike among the flannel weavers. Its objects were the sale of provisions, etc., the building and buying of houses for members, the employment of out-of-work members in manufacture, the purchase of an estate to be cultivated by members out of work or underpaid, "to establish a self-supporting home colony of united interests," and to start a temperance hotel. Cash payment and good quality were principles shared with the older movement, but the new departure on which the success of co-operation was to turn was the surrender of the attempt to sell at cost price. In lieu thereof Charles Howarth introduced the system of dividing profits upon purchases, and from that moment co-operation has never ceased to prosper. This system took the government of the society out of the hands of founders or shareholders and transferred it to the customers, that is to the general co-operative community. The rules for the organization of a Co-operative Society have remained substantially the same as those of the original Rochdale Society. To quote one example: "The object of this society is to carry on the trade of dealers in food, fuel, clothes, and other necessities, and manufacturers of the same; the trade of general dealers (wholesale and retail); including dealings of any description with land, and the trade of builders." Membership is free to all, and each member must hold a fixed minimum of one-pound shares one to five, carrying interest at 4 or 5 per cent. The maximum investment is £200, and each member has one vote only, whatever his holding of shares. The quarterly general meeting of the society is the governing body, but the management is in the hands of the committee, generally elected for a year, half retiring each six months. The secretary is elected for a year by the general meeting, but is the servant of the committee, which appoints all the other officials and workpeople. The shares can be withdrawn but are not transferable and therefore have never more than their face value. The business of the store is transacted in the same way and at the same prices as ordinary shopkeepers, and after interest has been paid the profits are divided among the customer-members in proportion to their purchases. Metal tokens or paper checks registering the value of each purchase are given to the buyer, and are collected periodically and credited to him. Non-members are allowed half dividend. Out of the profits a bonus is sometimes paid to labor (£45,073 in 1905) and grants made for educa-

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tional and charitable purposes (£120,831 in 1905).

The co-operative movement now grew with exceeding rapidity. In 1862 the total sales of all the societies of all kinds in the United Kingdom amounted to £2,333,523; in 1870 to £8,201,685; in 1880 to £23,248,314; in 1890 to £43,731,669; in 1900 to £81,020,428. In 1905 there were 1,457 retail societies with 2,153,185 members, a share capital of £26,077,174, total sales of £61,086,991, and profits of £9,959,238. Nineteen stores have annual sales exceeding £400,000 each. The obvious advantages of buying in large quantities led to the formation of the North of England Co-operative Wholesale Society in 1864 which in 1874 amalgamated with a similar metropolitan body to form the Co-operative Wholesale Society of England, with headquarters at Manchester. Only societies can be members and each member society must take up one five-pound share for each 10 of its members, such shares being transferable at par. The general committee of 16 sitting at Manchester governs the society with the assistance of two branch committees of eight each at Newcastle and London. The final authority resides in the quarterly meeting, which, for sake of convenience, is held in three parts at Manchester, Newcastle and London, each member-society being entitled to one delegate for each 500 members. Questions are settled by the total votes at the three meetings. Goods are sold at slightly over cost price and the profit divided among the purchasing societies in proportion to their purchases. The Scottish Co-operative Wholesale Society, established in 1868, is similarly managed, but the member-societies have one vote in virtue of their membership, one vote for the first £1,000 of purchases, and one vote for each additional £2,000. A bonus is paid to employees at the rate of twice the purchasers' dividend. The two Wholesale Societies do not compete but act as each other's agents. There are sale depots at Leeds, Nottingham, Blackburn, Huddersfield, Birmingham, Leith, Kilmarnock, and Dundee, and buying agencies in Ireland, Denmark, Germany, Spain, United States, Canada, etc. In 1905, the two societies had 1,419 members with £1,660,072 capital, their sales amounted to £27,725,207, and their profits to £635,873.

Besides buying and selling at wholesale, the Wholesale Societies carry on a large amount of manufacture — boots and shoes, candles, woollens, clothing, furniture, brushes, upholstery, bedding, butter, flour, lard, jam, tobacco and printing by the English society; flour, tweeds, blankets, tailoring, shirts, mantles, furniture, boots and shoes, hosiery, brushes, preserves, confectionery, tobacco, fish-curing and printing by the Scottish Society. The output of the English Society's productive works in 1905 was valued at £3,543,501, and of the Scottish Society at £1,942,321. The two societies own tea plantations in Ceylon, and the Scottish Society is now considering the purchase of a tract of land in Canada for wheat growing. The English Society conducts a banking department for the distributive stores and its turnover in 1905 was £98,999,831. The Co-operative Newspaper Society is another federal institution owned by co-operative societies. It publishes the *Co-*

operative News, the weekly organ of the movement. The Co-operative Insurance Society is another "society of societies" doing mainly fire insurance of society buildings, £22,000,000 of property being so insured. The United Baking Society of Glasgow (capital £130,372, sales £482,544 in 1905) and eight corn mills (capital £347,071, sales £1,364,527 in 1905) are also productive societies, federations of ordinary stores. Production to the amount of several millions sterling is carried on by ordinary distributive societies, mainly in flour and baking, 19,456 persons being employed in production, and much activity is also shown by many societies in building houses to be sold or leased to members. The total investments of the stores in "house property" (including presumably their own buildings) is £6,576,217.

A large section of co-operators has always held that co-operation, which did not include a co-partnership with labor, was only a *inasquerade*. To the Owenite communities succeeded the Redemptionist Societies "for carrying out the practice of associative labor," which had a brief life about 1850. The Christian Socialists—Kingsley, Maurice, Ludlow, Neale—in 1848–52 established some twelve "self-governing workshops" in which the employees were to supply capital, management, and labor. Next in the early sixties came the "Oldham Coops.," joint-stock cotton spinning companies in which the shares were mainly held by operatives, but they degenerated into ordinary companies. Efforts at founding manufacturing societies were persistent, and the wholesale and distributive societies and trade-unions lost large sums of money; 275 societies established before 1880 were extinct in 1882, leaving only eight corn-mills and 25 other societies. In 1884 the Labor Association was founded to promote productive societies on the basis of a co-partnership of labor and capital, the workers being entitled of right to a share of profit and being at liberty to invest their savings in shares. The mortality among societies continued high despite brisk propaganda—139 societies disappearing between 1880 and 1898. In 1905 there were 131 "productive societies" (excluding the federal corn-mills, the United Baking Society of Glasgow, and the Co-operative Newspaper Company) with 27,813 members, £409,054 share capital, £1,316,126 sales, and £68,051 profits. Losses were made by 23 societies, and of 91 making profits, 72 gave part to capital, 35 part to labor, and 37 part to purchasers. The Co-operative Production Federation was started to aid the societies with capital and prevent overlapping. Eighteen textile societies had sales of £456,100 and 22 boot and shoe societies had sales amounting to £272,935; 16 metal working societies had sales of £92,886 and 14 building societies sales of £92,825. A new branch of activity is the "Co-partnership Tenant's Movement" for building and owning houses which has established since 1888 many co-operative colonies; there are now eight societies, of which four are active with £82,600 capital. In agriculture there are now 125 societies with 10,000 members and £250,000 turnover; they consist of farmers and small holders, buy seed and manures and sell produce for their members. On the whole they

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belong to a different class from the ordinary working-class societies. Finally, there is to be mentioned the Co-operative Union, started in 1866, which carries on propaganda through its district committees and the United Board formed of representatives of the sectional boards. It is also the parliamentary organ of the movement and devotes much labor to organization and education. Under its auspices is held an annual congress of co-operative societies at which matters of interest to the movement are discussed, but the resolutions carried thereat have no mandatory force. The Woman's Co-operative Guild, started in 1883, had, in May 1906, 424 branches and 22,077 members; it has done much education work among woman members of stores and has been specially active in organizing special stores in very poor districts.

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29. Great Britain — Factory Legislation. In the year 1784, there raged at Radcliffe, near Manchester, an epidemic fever in the cotton spinning works, where long hours of labor and a total absence of sanitation had undermined the strength of the juvenile operatives. The conditions of work in the Radcliffe Mills were not worse than those prevailing throughout the neighboring industrial district, in which the new factories were multiplying fast. The epidemic of fever was but one among many similar epidemics. But when, at the request of the Lancashire Justices of the Peace, this particular outbreak was investigated by a committee of Manchester doctors, and when the leading physician among them, Dr. Thomas Percival, and the Chairman of the Quarter Sessions, Thomas Butterworth Bayley, persuaded their fellow magistrates that the gravity and rapid diffusion of the sickness really arose from the "putrid effluvia" of the "numbers crowded together" in the new mills, and the "injury done to young persons through confinement and too long continued labor," they were close to the discovery of the great device of factory legislation. At once the Manchester Justices, who were not at that date pecuniarily interested in cotton mills, decided henceforth to refuse to allow the "indentures of parish apprentices whereby they shall be bound to owners of cot-

ton mills and other works in which children are obliged to work in the night, or more than 10 hours in the day." In 1796, Dr. Percival and his friends definitely formulated certain resolutions, in which they again drew attention to the physical and moral evils of excessive hours of labor, of the unsanitary conditions of the factories and of night work; and in which they proposed, "if other methods appear not likely to effect the purpose," that Parliament should enact "a general system of laws for the wise, humane and equal government of all such works." Here we have expressly suggested the expediency of factory legislation. Within half a dozen years the first tiny instalment of that legislation—the "Health and Morals of Apprentices Act, 1802"—had, at the instance of the greatest mill owner of the time. (Sir Robert Peel), passed into law. This experimental legislation of 1802, expanded by Robert Owen in 1815 into a general principle of industrial government, and applied in tentative instalments by successive generations of unwilling statesmen, has spread to every industrial community in the Old World and the New. Of all the 19th century inventions in social organization, factory legislation is the most widely diffused. The opening of the 20th century finds it prevailing over a larger area than the public library or the savings bank; it is, perhaps, more far reaching if not more ubiquitous, than even the public elementary school or the policeman.

It is sometimes said that England has lost the lead in factory legislation; that New Zealand and several of the Australian states far outstrip her; and that in one respect or another France, Germany, Switzerland, and even Austria, surpass the United Kingdom in the protection of labor. This is not the place to examine into the accuracy of these assertions. It is by no means easy to ascertain, even from the laws of a country, exactly what national minimum it proposes to enforce, in all the varied circumstances of place and process, age and sex. Still less easy is it to discover to what extent the law is really obeyed and enforced. Though the policy of a national minimum is, in the United Kingdom, as yet most inadequately embodied in law, and most imperfectly enforced, yet it may well be that the scope of the factory legislation is, taken as a whole, and as applied in actual practice, more extensive than that of any other state.

What is often overlooked is that the law on the subject is, in the United Kingdom, not contained in any single code, or in any one act of Parliament, but has to be collected from among seven different branches of English law. There is first the law as to sanitation, which applies to factories as to other places, and is administered by the Town Council or other local governing body under the supervision and, more or less, the control of the local Government Board. With this we may name the law as to education, with its incidental restrictions on the employment of children under 14, enforced by the Town and County Council under the supervision of the Board of Education. It is partly in connection with education, too, though partly also in connection with the prevention of cruelty to children, that the Town and County Councils are empowered to

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make by-laws, subject to the approval of the Home Office, regulating or prohibiting the employment of children and young persons under 16 in certain occupations. The law regulating the conditions of employment as such is itself scattered over five distinct series of acts of Parliament, relating respectively to (a) factories and workshops generally, including all manufacturing industries, laundries, docks and works of engineering; administered partly by the Home Office itself and partly by the local governing bodies under the Local Government Board; (b) mines, administered wholly by the Home Office; (c) retail shops, administered wholly by the local government bodies, under the Local Government Board; (d) ships, and (e) railways, both administered wholly by the Board of Trade.

The principle underlying this mass of complicated and detailed legislation—a principle which was not consciously present to the mind of its early advocates, and one which is still only grudgingly admitted—is the establishment and enforcement of a "national minimum" in the circumstances of employment, below which it is judged to be inexpedient, in the permanent interests of the community as a whole, that any person should be employed. "The ultimate end of factory legislation," approvingly wrote the *Times* of 12 June 1874, "is to *prescribe* conditions of existence below which population shall not decline." This compulsory national minimum is naturally a rising one. "Every society is judged, and survives," aptly said Mr. Asquith in 1901, "according to the material and moral minimum which it *prescribes* to its members."

It would be an interesting and supremely useful subject for graduate study to discover what is the national minimum which the various civilized states of the world, now actually *prescribe*, by compulsory law, to the various grades and classes of citizens, in the different circumstances of their respective employments. To do this even for the United Kingdom would require much more than the space here available. The student would find that the system of regulation which began, in 1802, with the protection of the tiny class of pauper apprentices in textile mills now includes within its scope every manual worker in every manufacturing industry. From sanitation and the duration of labor, the law has extended to the age of commencing work, protection against accidents, the fixing of meal times and holidays, the methods of remuneration—not yet (though this, too, in New Zealand and Australia) the amount of the wages. The prescription of national minima is, however, still very far from being either uniform or systematic. The various requirements in the way of sanitation, duration of labor, hours of beginning and ending, age of commencement, meal times and holidays, methods of remuneration and protection against accidents, often apply, each of them, to particular industries, particular processes, particular ages, particular localities and particular sexes; partly, of course, because the various detailed prescriptions are, in their very nature, applicable only to this limited extent; but, more commonly merely on account of the empirical, and so to speak, accidental character of all our legislation. Speaking generally, we

may say that the policy of the national minimum has been most completely and efficiently worked out in the industry to which it was first applied, mainly cotton spinning and cotton weaving; and in which—whether *post hoc* or *propter hoc*—England still leads the world; taking industries generally, it has been far more thoroughly applied to the employment of women and children than to that of men, in respect to whom it is only just beginning; with regard to subjects of prescription, it is most universal in respect of the cleanliness, ventilation, temperature and sanitary accommodations of the work place, and the means of escape from fire; next most in respect of the age of commencement, the maximum working day and protection against accidents; whilst with regard to the enforcement of a national minimum of subsistence, we are in the United Kingdom, still in the stage of wondering how the unlettered rulers of New Zealand and various Australian states can manage actually to accomplish that which the English statesman and captain of industry agree to be demonstrably impossible. The policy of a national minimum secures universal lip homage, so far as it applies to children. Yet our young children may lawfully be industrially employed, or even hired out for wages, in all Ireland outside the few large cities, if in any industry not coming under the Factory Acts, at any age, at all hours, without stint; in Great Britain and the Irish cities (unless new by-laws have recently been made) in any such industry at any age, for any number of hours; under such by-laws, generally only after 11 years of age, and for limited hours, differing from place to place; in factories or workshops, not under 13, and then only halftime unless a minimum educational standard, prescribed by the local education authority, has been attained; generally speaking, full time after 14; but in some specified industries or processes not until 16, or even 18. Still more wanting in universality and uniformity is the enforcement of such national minima as the law does prescribe. The distribution of the task of enforcing the law among over 2,000 independent local governing bodies, in England, Scotland and Ireland; the supervision and imperfect control exercised over these by four different government departments in England, besides several others for Scotland and Ireland; and the very different views which these government departments take of their duties—to say nothing of the very different degrees to which they have consciously adopted the root-idea of factory legislation as above set forth—necessarily makes the enforcement of the law extremely uneven. Only in one branch, indeed, that which deals with "factories" properly so called, in which women and children are employed in connection with mechanical power, can the law be said to be at all successfully and systematically enforced from one end of the Kingdom to the other. This happens to be the branch of the law which is enforced by an official staff, appointed by and solely responsible to, the Home Office in London.

For the enforcement of the policy of the national minimum, so far as this is committed to him, the Home Secretary has at his disposal, in the Factory Department of the Home

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Office, a "Chief Inspector," a score of specialist and superintending inspectors, 42 district inspectors, nearly 50 extra inspectors who share the work of heavy districts, and nearly 40 assistant inspectors. This staff of about 150 men, who are paid from £150 to £1,000 a year, is supplemented by 15 lady inspectors, who receive from £200 to £300 a year. All the staff are appointed after examination, without regard to politics, and are permanently employed. These inspectors are perpetually traveling over the United Kingdom, covering among them, nearly a million miles annually, and keeping under inspection more than a quarter of a million distinct factories, workshops, warehouses, laundries, docks and wharves (excluding those employing adult men only, which are ignored in practice), in which nearly five millions of persons are employed. Their efforts are aided by about 2,000 "certifying surgeons," who are paid by fees only. These are doctors in local practice who give the certificates of health without which, in certain cases, children cannot be employed. A similar, but more limited, staff is employed in the inspection of the mines and quarries. The tradition of the Home Office in this department is that it is the business of the inspector, not merely to act on complaints, or to make so many visits, but to get the law enforced. Hence, the inspectors go hither and thither as they think fit, visiting one factory frequently, another not at all; acting on any hint or suggestion that they can get of any illegality being committed, and, not only not refusing to act on anonymous communications, but eagerly welcoming them when nothing better is to be had. Unfortunately, however, the paucity of the staff allowed to it by the treasury, and the curious reluctance of English government departments to see their functions expand, has led the Home Office to forego whole fields of industrial employment in which the enforcement of a national minimum is no less necessary than those which it inspects. It deliberately omits from its regular inspection, not only the workplaces where men only are employed (though these are also subject to the law in various particulars), but also the myriads of "domestic workshops," in which only members of the same family are employed, and in which the worst cases of "sweating" are found. The sanitation, too, of the workshops (not using mechanical power), even where women and children are employed, is, like the whole regulation of the homeworkers, abandoned to the more perfunctory hands of the local authorities. On the other hand, it must be said that the Home Office far surpasses the Board of Trade in the execution of its duty of enforcing the policy of the national minimum. The scanty inspectorial staff of the Board of Trade, on whom we have to rely for the enforcement of the law relating to the conditions of employment in connection with railways and ships, confines itself, practically, to the investigation of cases actually brought to its notice by responsible specific complaints, or by accidents; and takes up the attitude that it is not the business of the office, or of its parliamentary chief, to initiate anything. To the student of the factory system of the 19th century, the reflection will inevitably occur that, if the Home Office

had acted on this principle, we should still have with us the "white slavery" of the Lancashire Cotton Mills, denounced by Oastler and Lord Ashley. But there is even a lower depth than the Board of Trade. The Local Government Board, the department to which Parliament has entrusted the enforcement of the national minimum of sanitation takes no action whatever to see that the local governing bodies put into operation the sanitary provisions of the Factory Acts with regard to workshops and the residences of home-workers; and fails even to compel negligent or recalcitrant local government bodies to put in force the Public Health Acts. It does not even make itself aware of the extent to which the national minimum of sanitation is being secured in the different localities.

Thus it is that, after a whole century of experiment in factory legislation—of experiment so demonstrably successful that it has converted the statesmen and the economists of the entire civilized world—the United Kingdom still contains districts, classes, and industries in which there prevail the precise evils from which the cotton operatives of Lancashire and the coal miners of Northumberland suffered a century ago. The so-called "sweated" trades, to which factory legislation has not yet been effectively applied, remain as they were described by the select committee of the House of Lords in 1890, regions of "earnings barely sufficient to sustain existence; hours of labor such as to make the lives of the workers periods of almost ceaseless toil; sanitary conditions injurious to the health of the persons employed and dangerous to the public." What those who believe in factory legislation demand, and what the second century of such legislation may bring to us, is the conscious application of the policy of the national minimum to every branch of industrial employment; the explicit formulation of this policy in a systematic code, applicable, with only the necessary technical variations, to every trade in every part of the Kingdom, and to every worker in such trade, of whatever age or sex; the deliberate prescription, in the interest of the whole community, of the conditions of employment, whether sanitation or hours, education or subsistence, below which no individual can be permitted to be employed; and the vigilant enforcement of this minute universal code by the joint activities of the central departments and local governing authorities, each acting, through its highly organized inspectorate, as a check, not only upon all who break the law, but also upon any who should neglect their own part of its enforcement.

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THE IDEAL LIFE OF THE NATION.

30 (a). **Great Britain—The Church of England.** It is difficult to define the characteristics of the Church of England so as to enable an outsider to understand it. In much that concerns its external form and traditions it is probably the most mediæval institution in Europe. In much that concerns its religious teaching and life it is more abreast of modern thought than any other religious body. The former characteristic may be illustrated by the fact that its property is held in some cases by direct gift of Anglo-Saxon kings, and that many of its institutions are feudal in their origin. Again it differs from any of the Protestant Churches of the Continent by the fact that it does not express as they do the teaching or influence of one individual reformer. In a very true sense its history has been continuous. It is an institution which has grown and developed with the history of the English people. It has been modified and changed to meet the needs of each age. It is an institution which has created a theology, not one which is the outcome of its theology. It is therefore clear that the Church of England can only be described by its history.

History.—The history of the Church of England dates from the mission of Augustine in 597 A.D. This mission was the direct action of the Church of Rome, but almost from the beginning there were other elements. A large part of England was as a matter of fact converted by missionaries from Scotland and Ireland, representatives of the old Celtic Church. Although the organization introduced by Augustine and Theodore ultimately prevailed through the whole island, yet the Church contained elements and traditions derived from Celtic sources. Gregory the Great had used language in his letters to Augustine which implied that a considerable degree of independent development was to be left to the newly founded Church, and from the first its rites and ceremonies differed from the Roman. During the Anglo-Saxon period there were two elements in its history. The kings and the people of England were full of admiration for the Church of Rome to which they owed Christianity, but, on the other hand, the Church developed more and more as a national institution and its ecclesiastical laws were the work very largely of secular councils, on which the bishops sat. The Norman Conquest brought the British Isles very much into the swim of European life, and gradually two opposing currents of policy asserted themselves strongly. On the one side a series of able ecclesiastics

aimed at securing the independence and privileges of the Church and at bringing it into close obedience to the central organization at Rome. On the other side the national development tended to assert the insularity and independence of the English state and sovereigns. There was a strong opposition to foreign ecclesiastics, to payments to foreign courts and to the influence of foreign monastic orders. Legislation such as the Act of Praemunire was introduced, limiting ecclesiastical authority and in the reign of Henry V. the property of alien priories was confiscated. Throughout the Middle Ages there is literary evidence of criticism on much connected with the Church, which reached its head in the work of Wycliffe who combined opposition to the monastic body and the Church of Rome with a good deal which would be called in the present day Radicalism.

Like the Church of England the history of the Reformation (q.v.) is a complicated story. The final result was produced by various influences. There was the old national feeling as opposed to the claims of the papal curia expressed in the Reformation Acts by the statement that the realm of England was and always had been an Empire; there was the influence of the Humanism of Colet, More and Erasmus, which demanded a Conservative Reformation; there was the popular objection to the rights and privileges of the clergy; there was the strong conservative element which has always been characteristic of the English people and which checked any great tendency to change; and especially during the reign of Elizabeth there was the influence of the foreign reformers. The result was a Conservative Reformation. No attempt was made to sweep away the Old Church and reconstruct it, either doctrinally or as regards the constitution *de novo*. Such changes were made as were found necessary to express the different influences which prevailed. This might be shown in various ways and will appear as we proceed with our account. For example by a statute law which has never been repealed, the whole of the canon law which had been accepted in England before the Reformation is still the law of the Church, except in so far as it is contrary to Act of Parliament. By the time of Queen Elizabeth's reign the various parties had become clear. It was clearly the aim of the rulers of the time to unite as many elements as possible in one national Church and the ultimate reform settlement was based therefore on a policy of modelling a national Church which should include very varied elements. The result of the

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Reformation was to modify and reform the existing institutions, not to create a new Church in accordance with any system of doctrine. (See GREAT BRITAIN—THE REFORMATION.)

Since that time the Church of England has suffered hardly any change in its formularies or in its constitution; but it has been profoundly changed by the influence of various schools of thought, each of which has interpreted its formularies in accordance with their convictions. The close of the reign of Queen Elizabeth, the writings of Hooker, mark the beginning of a typical theology, and Anglicanism in the modern sense of the term was developed and worked out by the great divines of the 17th century. The result of the Commonwealth and of the Puritan domination was to strengthen the hold of the English Church on the nation, and at the time of the Restoration a vast majority of the people were attached to it. A very little more statesmanship on the part of the restored Cavaliers might have almost wiped out Puritan traditions. At the time of the Restoration the High Church party were the dominant factors in the Church, but the Roman tendencies of Charles II., the Roman Catholic position of James II., the fear of papal influence, and the Non-Jurors schism on the accession of William weakened its influence. Some of the ablest members of the High Church party left the Church at the time of the Non-Jurors' secession. High Churchmen were under suspicion as being opposed to the reigning dynasty, and in the first half of the 18th century the prevailing influence was the latitudinarian movement associated largely with the name of Tillotson. The Whig ascendancy, the suppression of convocations and the influence of the deistic literature reduced the spiritual life of the country to the lowest ebb. The movement for religious awakening grew up in the Church of England, but a secularized Church was unable to contain the vigorous spiritual life of Wesleyanism. But though the Wesleyan Society passed outside the Church, its influence lived within it, and at the close of the 18th and the beginning of the 19th century, the evangelical movement was strong. All through this period the High Church party had lived on. The failure of the Stuart succession destroyed all suspicion of disloyalty, and eventually latitudinarianism and evangelicalism lost their hold on the country. High Church influences began to assert themselves again. The religious movement was assisted by a romantic reaction against the commonplace 18th century traditions and by the revival of an idealistic philosophy, and it came to a head in the well-known Oxford Movement, which is usually supposed to date from the year 1833. The Oxford Movement in its double aspect of High Church principles and of ritualism has profoundly changed the religious life of the whole Anglo-Saxon world. It was followed rapidly by a Broad Church reaction, and there has been a tendency of recent years for a new party to arise, combining many of the elements of both the schools. At the present time the theology of the Church of England is influenced by all the different movements we have described. The Church of England is not "Anglicanism," but it has created Anglicanism within the fold of an Establishment. Vari-

ous different types of thought prevail and the position can only be understood by looking at the Church as the result of the history we have described.

General Principles.—The Church claims to be that portion of the Universal Church of Christ located in England, a "true and apostolical Church teaching the doctrine of the Apostles." It acknowledges that to the Crown "the chief government of all estates of this realm, whether they be ecclesiastical or civil in all cases doth appertain." It is established, i. e. it is part of the constitution of the country. It is National; Protestant in so far as denying that the Bishop of Rome has jurisdiction in England and condemning the errors of the Roman Church; Catholic as claiming to be a portion of the Universal Church of Christ. It grounds itself on Scripture and the three creeds. Its ministers are bishops, priests, and deacons. It claims to be continuous with the primitive church.

Constitution and Law.—The constitution of the Church was influenced by two main characteristics. One was a desire to do away with what we believe to be mediæval corruptions; the other to preserve the primitive organization of the Church. Naturally also there was a tendency to preserve all the distinctly national institutions which were inherited from the past. The orders of the Church of England are: bishops, priests, and deacons, and it is definitely laid down that the possession of episcopal ordination is necessary for holding office in the Church. The clergy of the Church meet in their own assemblies in Convocation which were originally the meetings of the clergy for taxing themselves at the time when they were immune from general taxation. At the present day, Convocations have no legislative power except such as is intrusted to them on any special occasion by Parliament, and no change can be made in any law or custom of the Church without the consent of Parliament. But it was the theory, not perhaps always acted upon, of the Reformation and it has been the custom since, that Parliament should not legislate for the Church except with the advice of the clergy. Practically the result of this has been that external changes in either form or constitution of the Church have hardly been made since the Act of Uniformity of the year 1662. By the common law of the country the parson or parish priest has a freehold in his cure, and he can only be removed by very complicated legal processes. The result of this has been to make the English clergy very independent of any authority. The influence of the bishops as men may be very powerful and effective but if they wish to support their opinions or the administration of the law by any appeal to authority they are hampered at every turn by a complicated legal system which makes it exceedingly difficult for them, even in spite of recent changes, to interfere with acrimonious or refractory clerks. The difficulties have been increased by the unsatisfactory character of the Church Courts. It is a fundamental principle of the English law that the Sovereign is in all causes, as well ecclesiastical as civil, supreme. The Church has its own courts and those courts are very largely secular in character and do not command the

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adherence of the clergy, while the Judicial Committee of Privy Council which is the final court of appeal in matters ecclesiastical, has not confined itself to reviewing judgments of courts on the point of view of justice to the individual, but has attempted to legislate by its judgments, and has not met with anything like universal acceptance. The position then is that the constitution of the Church and the Church Courts has grown up not in obedience to any particular theory, but by modifications from time to time of the traditional system and that it does not at present satisfy the convictions of a large section of the Church.

Establishment.—The position of the Church of England is that it is established by law and it is part of the constitution of the country. What exactly this implies has never been clearly defined and there are different sections of opinion on the subject in the country. The High Church party claim that the position of the Church is continuous with that before the Reformation and that the Church is by constitutional right free to determine its own teaching. A party which would be called by their opponents Erastian would claim that the Church was entirely subject to the Sovereign and to the Houses of Parliament. The former would point out that the Sovereign is rightly supreme in all actions relating to liberty of person and property, that (as shown by many Acts of Parliament, notably the Scottish Church Act of 1905), when questions of property are involved the Civil Courts or Parliament have to deal with the internal matters of the different religious bodies whether they call themselves "Free" or not, and that what the state has done is to accept to a large extent the Church Courts as part of its constitution.

The situation can really be determined only by historical principles. The position of the Church is that it is not in obedience to any theory but in obedience to a number of historical facts. During the Middle Ages the Church had great independence. The clergy had the right of taxing themselves and met for that purpose in their convocations. The bishops and mitred abbots were members of the House of Peers, but there was continued friction between the crown lawyers and ecclesiastical lawyers as to their respective jurisdiction and the secular authorities always resented the right of appeal in ecclesiastical matters to Rome. The present position of the Church and State is determined by the following points: (1) The position of the Sovereign is in a certain sense that of the head of the Church. It is to be noted that the title "Supreme Head" was definitely given up by Queen Elizabeth and the actual position is rather that the Sovereign is head over "all causes, as well ecclesiastical as civil, supreme." (2) The patronage of the Crown. The Crown appoints to all bishoprics and deaneries and to many canonries of the inferior clergy. In most cases the Crown right of patronage is directly inherited from the Middle Ages or taken over from the rights of the Popes. (3) The Church is subject, like every other body in the kingdom, to the laws laid down by Parliament. The Book of Common Prayer has been adopted by Parliament, and by

the Act of Uniformity the authority of the State is added to the authority of the Church.

The Property of the Church.—The property of the Church consists of the following: (1) Tithes, which are charges upon the land paid originally to the parochial clergy. The origin of the institution of the tithes is much debated. It appears to have begun as a voluntary custom from charges made upon the land by the owners, and these customs and charges have gradually been recognized by law and become universal. Up to the time of the Tithe Commutation Act in 1836 all these payments were made in kind; by that Act they were commuted into money payments. (2) Landed Property. The Church has inherited a portion of the large estates which were in the possession of the bishops and other ecclesiastical bodies during the Middle Ages. These were ultimately derived in many cases from a grant by the sovereign or of individual land-owners. They include in addition to landed property, manorial rights and in the County Palatine of Durham royalty rights. In many cases they date from a period before the Conquest; for instance, Farnham Castle has been the property of the Bishops of Winchester from the time of a grant made in Anglo-Saxon times. In the great majority of cases now the landed property apart from the Glebe lands of the parochial clergy is managed by the Ecclesiastical Commissioners and the bishops receive fixed stipends. (3) Modern Endowments. These largely consist of money, and are for the most part administered by the Ecclesiastical Commissioners.

Prayer Book.—The character of the Church of England is shown very clearly in the Book of Common Prayer. The Prefaces lay down that the object throughout was to preserve the old form of services but to fit them to the altered needs of the time, and in many cases to return to what were looked upon as more primitive customs. The first edition of the Prayer Book was issued in 1549, the second in 1552, the third in 1559, the fourth in 1604, and the fifth edition in 1662. The services throughout preserve the structure of the pre-Reformation books, but they are shortened and simplified. What was believed to be superstitious was cut out, and, of course, the whole translated into the English language. The Prayer Book was influenced to a certain extent by some of the earlier Lutheran formularies and some of the finest of the collects were the work of Archbishop Cranmer himself.

Doctrinal Formula.—The doctrinal formula of the Church of England is the Thirty-nine Articles and the belief of the Church is also to be gathered in the Homilies and Prayer Book. The production of religious formulæ was the leading feature of all sections of the Christian Church during the Reformation period and amongst all the varied formulæ the Articles of the Church of England are conspicuous for their shortness. During the reign of Henry VIII. various doctrinal documents were issued. The first document we have to consider is the Forty-two Articles issued in 1553. They were not systematic in character, they were mainly directed against the different evils of the time and in their broad outline were concerned with the errors of the Anabaptists on the one

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side and the Mediaeval Schoolmen on the other. These Articles were revised in the reign of Elizabeth and published as in Thirty-eight Articles in 1563. These were made more systematic in character and the relation of the Church of England both to certain Protestant movements on the Continent and to the Church of Rome was more accurately defined. By this time the results of the Reformation had begun to shape themselves more clearly. But throughout they bore the impress of the statesman. They were clearly drawn up with the object of including as large a number as possible of the different sections of opinion which existed at the time within the limits of the national Church. These were further revised and finally issued as the Thirty-nine Articles in 1571. At one time the subscription to these Articles was imposed by the State not only on all the clergy but all sections of the laity as the means of qualifying for office, but the tests for the laity have now been entirely done away with and that of the clergy is limited to a general assent to the teaching of the Articles. The courts have always been very broad in their interpretation of the doctrine of the Church of England. The clergy undertake to use the Prayer Book and no other document in public worship except in so far as allowed by lawful authority and give a general assent to the teaching of the Thirty-nine Articles. Within these limits the fullest freedom of opinion and expression of opinion is allowed.

Anglican Theology.—The theology of the Church of England has had certain special characteristics. (1) Owing to its connection with the universities there has always been a markedly learned character about a section of its clergy. *Clerus Anglicanus stupor mundi* was the verdict of the 17th century, and during that period a number of very learned works were produced by the Church. It suffered like all departments of the country by the intellectual lethargy of the universities in the 18th century. In the 19th century its character to a large extent revived. (2) But though a learned Church there have always been certain characteristics to distinguish it from other religious bodies. Its interest has been very largely in historical and exegetical studies. It has sedulously eschewed systematic theology. There is not at the present day an authoritative work stating the beliefs of the Church of England. It has been largely concerned with questions of ecclesiastical organization and the special features which have distinguished it from the Roman Catholic and Protestant churches. (3) The most prominent product of its activity has been the creation of that school of theology which might be defined as Anglican. Whereas Luther and Calvin created Lutheranism and Calvinism the traditions of Anglicanism, on the contrary, are the product of the position of the Church of England rather than the creator of it. Although certain broad principles underlie the Reformation it would be impossible to say that any one prominent principle prevailed, but the result of a Conservative Reformation, with some reference to primitive truth, was to create a body which preserved historical tradition in the threefold order of bishops, priests, and deacons, and the customs and rites of the primitive

Church and at the same time had largely abolished mediaeval corruption. The defence of this position created Anglicanism. A knowledge of the Eastern Church provided the exponents of that system with a very strong weapon and the Oxford Movement (q.v.) finally made this the dominant note in Anglican theology. But it must not be thought that it is necessary to hold "Anglican" views to be a member of the Church of England. Within the limits of the Church are many who would strongly object to those views. (4) The opportunities for a liberal position created on the one side by the relations of the Church with the universities and on the other side by the freedom of opinion secured by secular courts created a strong Broad Church movement. As the modern exposition of Anglicanism dates from the 'Tracts of the Times' so the modern exposition of the Broad Church theology dates from 'Essays and Reviews.' The aim of the Broad churchman has always been to keep himself in touch with modern science and modern criticism. But of recent years there has been a considerable rapprochement between these two schools and the appearance of 'Lux Mundi' marked a new departure by which the Anglican school accepted many of the results of modern criticism and thought which their predecessors had condemned. (5) Ever since the Wesleyan movement, and the Evangelical movement which was its accompaniment in the Church of England, there has been a strong Evangelical party within the Church. Its tenets were represented by Simeon and the Cambridge school of the early 19th century and it took for many years a lead in philanthropic work and is especially connected with the abolition of the slave trade. But it has always failed as compared with the other two schools in an intellectual exposition of its system and has never in any great degree influenced the theology of the Church. Outside all these definite schools it is probable that there is a considerable element in the Church consisting of those who are by tradition loyal members of the Church of England, who accept its formularies without attempting to interpret them very definitely, whose interest in religion is practical rather than theoretical, and who are prepared to accept and work from the point of view of common sense rather than of elaborate theological accuracy the system in which they find themselves.

Doctrinal Teaching.—As will appear from what has been said above it is not particularly easy to fix the standard of belief in the Church of England. On the one hand it did not arise from a definite body of teaching, like that of the Lutheran and Calvinistic churches, on the other side its Articles were drawn up with the idea of inclusion rather than exclusion. Moreover its historical position has led to its holding a mediating belief in many respects. A resolution, however, of the Lambeth Conference has laid down the following principles. (1) The acceptance of the Old and New Testaments. The English Church, however, has never accepted the position that the Bible and the Bible only is the authority for its belief. Its definite statement is that whatever is not contained therein or may be proved thereby is not necessary to salvation. But it has always recognized

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that in interpreting the Bible the traditions of the Church may be used. As regards the canon of Scripture it occupies a middle position between the Protestant and Roman Catholic churches. It accepts the Apocrypha, though not as a standard of belief, or as authority for faith. (2) The acceptance of the two Creeds: The Nicene and the Apostles. This definitely means that its standard of belief is the traditional, orthodox teaching of the Church. It is, however, slow to express a decision, or impose its belief. (3) The acceptance of the two sacraments, of Baptism and the Lord's Supper, as generally necessary to salvation. As regards sacramental teaching it has always been very wide in its limits. It makes its standard the acceptance of the authorized service and it has frankly admitted that while Zwinglianism and the doctrine of transubstantiation are incompatible with its formularies, within these limits any form of eucharistic doctrine is allowed. As regards other rites and ceremonies it has always made a very definite distinction between the two sacraments and others, although its formulas have occasionally used the term sacrament in a wider signification. But it lays great stress on confirmation, orders, and matrimony and allows private absolution and confession, although it does not make them compulsory. (4) The acceptance of the threefold ministry of bishops, priests and deacons. Here again its demands point to a system rather than to a doctrine. All its clergy must be episcopally ordained, but it does not demand any definite theory of ordination apart from what is implied in acceptance of the ordinal. A section of the Church would make the acceptance of the doctrine of apostolic succession necessary, but it has never been the teaching of the Church officially and as a whole.

Negatively the Church condemns emphatically the system and authority of the Roman Catholic Church and the infallibility and supremacy of the Pope. It definitely condemns also certain doctrines of purgatory, the invocation of saints, the sacrifice of the mass, relics, the merits of the saints, and works of supererogation. In relation to the Eastern Church, while differing fundamentally in tone and temper it is very nearly in doctrinal harmony, the chief points of distinction being of course the invocation of saints, the doctrine of the double procession, the use of the term transubstantiation, while there is some general hesitation about the acceptance of all the seven councils or the necessary acceptance of the seven sacraments. As against the Protestant churches as a whole, it would always avoid accepting the extreme forms of predestination or justification by faith; it would lay stress on the need of interpreting the Scriptures in accordance with the traditions of the Church; it would almost universally lay greater stress on the reality of the sacramental system, and it would maintain episcopacy as an institution against every other form of Church government whilst condemning the tendency to disunion which characterizes so many of the Protestant bodies. To some its mediating attitude appears to be a mere political compromise between two incompatible ideals, to its own members it would seem to be the one Church which most clearly holds the balance between the various conflicting aspects of Christianity.

The Church and the Nation.—The relation of the Church of England to the English nation has been modified very considerably in the early part of the last century by a series of enactments. Almost all its exclusive privileges have been gradually taken away. It has no longer a paramount position in the universities, and membership of the Church of England is no longer necessary for any civil position in the state. Side by side with this there has been an enormous increase in the population, which has made the existing ecclesiastical arrangements quite unfit to cope with the immense mass of new work. Many of the dioceses are excessively large and the process of sub-division has not been rapid enough to keep up with the demands. In many districts the clergy and the Church have been quite inadequate to meet the spiritual demands of the people. This fact, combined with the increase in just those sections of the populace which were least touched by the influence of the Church of England, has led to a very great increase in Nonconformity. But this loss of privilege and greater need of work have not been detrimental on the whole to the Church. The various spiritual movements that we have narrated and the demands of the day have stirred up an immense amount of voluntary work on the part of the Church. The old rigid high and dry schools have had to make way for younger men with very varied forms of activity. Methods of religious propaganda have been borrowed, alike from Nonconformist and Roman Catholic sources. The Church has taken a vigorous interest in educational and social topics. Missionary enterprises, always strongly supported by the Low Church party, have been exceedingly vigorous. The exigencies of a Colonial Empire, the spread of commercial activity, have created new demands, and the last hundred years have marked an immense increase in the religious activity and the enterprise of the Church. Including the Anglican Church in America the number of bishops now connected with the Church exceeds 300, and every 10 years the Conference at Lambeth marks the extent and growth of the Anglican Church.

As regards its hold upon the people there are no trustworthy statistics, but on the upper and upper-middle classes its hold is very strong. Amongst the working classes the greater majority are nominally adherents of the Church of England, but a great deal of the religious life is Nonconformist. As against Nonconformity the Church of England is little organized for political activity, and its hold upon the people and its influence are very intangible and indeterminable quantities. Probably, except perhaps, in some of the great centres of the populace, its influence is very much greater than is often imagined.

Bibliography—History.—The best continuous history of the Church of England is probably 'A History of the English Church' in eight volumes by various writers, edited by the late Very Rev. W. R. W. Stephens and the Rev. William Hunt. Shorter histories are those by Wakeman, Spencer, Boyd-Carpenter, etc.

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30 (b). **Great Britain — English Nonconformity.** *Early History* — *Death of Queen Elizabeth.*—Nonconformity as a definite ecclesiastical movement in English history may be said to have had its origin in Elizabeth's reign. But regarded as a spiritual force appearing now and again and here and there in the nation, it may be traced back to a much earlier time. All who protested against the prevailing ecclesiastical assumptions of the clergy, and who dared to think and act for themselves in matters spiritual, may be regarded as Nonconformists, and were called to suffer for their faith. From 1401, when the statute for burning heretics came into force, to 1534, the date of the renunciation of Papal supremacy, no fewer than 111 persons were burnt at the stake; and from 1534 to 1558, the year Queen Mary died, 337 more were added to the roll of the protestant martyrs. On the accession of Queen Elizabeth it was hoped that a better day had dawned for those men of Puritan sort who desired to see the Reformation carried still further. But, while breaking with the Papacy as completely as did her father before her, the queen was not prepared to yield to what she regarded as their extreme views in the matter of religious ceremonial. She cared for order, pomp, and appearance in the worship of the Church as in other things, and her princely power combined with her indomitable will made her supreme in ecclesiastical affairs. Several of the bishops and divines in the early years of her reign had been in close friendship with the continental Reformers and were prepared to go far in the Puritan direction. But the queen would not hear of it. Bishop Jewell writing to his friend Bullinger at Zurich in 1566 said: "I wish that all, even the slightest vestiges of Popery might be removed from our Church, and above all from our minds. But the queen at this time is unable to endure the least alteration in matters of religion." Thus began that conflict between the individual conscience and the power of the state church which has continued down to our own time.

The rupture between Elizabeth and the Puritan party first took open shape on the promulgation of the orders known as "Advertisements," which, in 1566, specified the minimum of ceremonial the State was prepared to tolerate in the services of the Church. Uniformity was to begin to be enforced at a given date, and deprivation of benefice was to follow in the case of the clergy after three months' refusal of compliance.

The two sides thus having joined issue the Puritan party became divided, taking different

directions. Many of the ministers conformed, using only such ceremonial as they were compelled, submitting to many things they did not approve in the hope of a better time when a simpler and, as they believed, a more scriptural system, might come to prevail. Others, again, while remaining in the Church, sought to bring about a radical change in the direction of Presbyterianism, the discipline of which was elaborately organized both in London and the Midlands, and a literature created which assailed with more and more of vehemence the existing establishment. In 1571 Thomas Cartwright, Lady Margaret Professor of Divinity at Cambridge, issued two addresses to Parliament under the title of "A First" and "A Second Admonition," which were elaborate attacks upon the Episcopal system, and vigorous assertions of the divine right of the Genevan discipline. Having exercised this discipline privately for a time they proceeded to bolder measures, setting up their system openly in the parish churches of Northamptonshire and Warwickshire. Eventually, however, this movement was stamped out by the greater power of the State, and Nonconformity was henceforth to be sought for in other directions. Some of the Puritans became actual Separatists from the episcopal system. Their starting-point in church polity was the existence of spiritual life, the personal relation of the individual soul to God; and a church in their view was a community of spiritual men: "The kingdom of God," said they, "is not to be begun by whole parishes, but rather of the worthiest, were they never so few." Taking as their fundamental position that the Church visible consists of a company and fellowship of faithful and holy people gathered in the name of Christ, they went on to maintain that a Church so composed is competent for self-government. This self-governing power they further regarded not so much as a privilege to be enjoyed as a sacred trust to be discharged. The period when these men, who came to be known as Congregationalists or Independents, actively promulgated their views may be roughly stated as between 1570 and 1593. Their leaders during the first half of this period were Richard Fitz, the pastor of a London church, and Robert Browne and Robert Harrison who formed a Congregational church in Norwich in 1580; and the most active promoters of their principles in the second half of this period were Henry Barrowe and John Greenwood, who, together with John Penry, the Welsh martyr, suffered death for their opinions in 1593.

The penal laws against Nonconformity, severe before, were made still more severe by the Conventicle Act of 1593, which provided that all persons above 16 years of age being present at unlawful conventicles, should, on conviction, be committed to prison, there to remain without bail or mainprize until they made open submission and declaration of conformity at some church or chapel, or usual place of common prayer. The offender who refused to make such public submission within three months of conviction should be compelled "to abjure this realm of England, and all other the Queen's Majesty's dominions forever." This sternly repressive Act explains why during the

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10 years previous to the accession of James I. so many Nonconformists languished in prison, while many were banished, and many more went into voluntary exile.

From the Accession of James I. to the Revolution of 1688.—With the death of Elizabeth and the accession of James I. the hopes of the Puritan party once more revived. For the king had been brought up among Presbyterians, had been the pupil of George Buchanan, and a frequent hearer of the disciples of John Knox; and had even invited Thomas Cartwright, the leader of the English Presbyterians to a professorship in Scotland. Regarding him, therefore, as at least not unfavorable to Puritan ideas, they met him on his way to London in 1603 and presented the Millenary Petition, so called, as representing the views of a thousand of the clergy. But again their hopes were destined to disappointment. At the Hampton Court Conference, held the following January, the King spoke contemptuously of Presbyterianism and declared he would either make these church reformers conform themselves or he would harry them out of the land. The Conference was followed by the Canons of Convocation which were so constructed as to make it impossible for any man who disagreed with the constitution and articles of the Church, as set forth in them, to remain honestly among its clergy. The immediate result was that some 300 ministers were ejected from their livings. The Nonconformists who had fled to Holland in search of liberty of worship after the Conventicle Act of 1593 were reinforced from time to time by the arrival of others of like mind. Especially memorable among these were the members of the little church at Scrooby in Nottinghamshire, who, under the leadership of William Brewster and John Robinson, fled to Amsterdam in 1608, and subsequently settled in Leyden. This was the church from which, in 1620, the Pilgrim Fathers of New England crossed the Atlantic as the founders of Plymouth Colony, the starting-point of the United States.

The Separatists who remained in England were subjected to perpetual hardships and persecution on account of their faith. James I. was succeeded by Charles I., the new king coming completely under the influence of Archbishop Laud, who proceeded to great lengths in enforcing conformity to Prayer Book, articles and canons. While the two opposing forces of Catholic tradition and Puritan earnestness were thus contending within the arena of church life, the two opposing forces of absolutism and the desire for popular government were at the same time at war within the political sphere. The men who contended for the divine right of bishops maintained also the theory of absolute monarchy and the divine right of kings. The leaders of the Church made the serious mistake of allying its interests with the side hostile to the constitutional liberties of the nation. With a high-spirited people such a course could only have one issue—that of disaster and overthrow. The attempt to base the Church on the subversion of freedom ended in civil war and the temporary overthrow of the very institutions the advocates of absolute government sought to maintain.

After Charles and Laud came the Long Par-

liament and Cromwell. Two main ideas seem to have guided Cromwell's ecclesiastical policy—first, that there should be an established non-episcopal Church, on a broad basis of evangelical comprehension, to be endowed and controlled by the State; and next, that outside that Church there should be an ample toleration of Dissent, which therefore provided for the existence of separate congregations. The Church, as established, recognized no one form of ecclesiastical organization; it had no church courts, no church laws or ordinances. Nothing was said about rites and ceremonies, nothing even about sacraments. These were left as open questions to be determined by each congregation for itself. All that the commissioners for each county dealt with was the personal piety and intellectual fitness of the minister presented by the patron to the living; and the church buildings were regarded as the property of the several parishes.

This loosely organized system came to an end with the ending of Cromwell's life. When the strong hand which alone was able to control the conflicting forces let loose in a time of civil war, fell powerless, the nation, weary of strife, restored the monarchy, and with the restoration of the monarchy there came back also the episcopal system of government in the Church. In 1662 the Act of Uniformity cast out 2,000 of the ministers as being unable to give unfeigned assent and consent to all and everything contained and prescribed in the Book of Common Prayer. From that hour Nonconformity took definite and permanent shape in English national life. It defied all attempts to crush it out of existence. The Conventicle Acts of 1664 and 1670 sent thousands of godly people to prison where many of them died in the pestilential jails of the time. Others were ruined by heavy fines and the spoiling of their goods, but the more Nonconformity was oppressed the more it grew, and at length by the Declaration of Indulgence of 1672 the government was compelled to admit that no fruit had been gained by these forceful courses. Still after brief respite these forceful courses were resorted to again. Conventicles were again frequented; spies and informers renewed their dishonored calling and persecution went on its cruel and iniquitous way so long as the Stuart kings remained on the English throne. Happily sooner or later tyranny digs its own grave, and when William of Orange landed at Torbay, 5 Nov. 1688, the hour of deliverance had struck. The persecuted Nonconformists felt that the tidings were almost too good to be true. Year by year for a long period they observed the anniversary of their emancipation, exclaiming ever and again: "When the Lord turned again the captivity of Zion we were like them that dream. The Lord hath done great things for us whereof we are glad!"

From 1688 to the Present Time.—The Revolution of 1688 was followed by the Toleration Act of 1689 which repealed the Penal Acts and permitted Nonconformists to erect their own places of worship which were registered, and so placed under the protection of the State. To the providing of local habitation for their communities and their principles they addressed themselves with considerable energy.

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In the quarter of a century which elapsed between the accession of William III. and the death of Queen Anne, besides many temporary structures, some 1,500 permanent places of worship were opened and maintained. The political history of Nonconformity in the 18th century is largely concerned with the endeavor to set aside certain disabilities to which its adherents were still subjected, the Toleration Act notwithstanding. The Corporation Act of 1661 provided that no person could be elected as mayor, alderman, recorder, bailiff, town clerk, or common-councilman who had not previously taken the sacrament according to the rites of the Church of England. The Test Act of 1673, though aimed mainly at the Roman Catholics, by widening the scope of the Corporation Act told heavily also against Protestant Nonconformists. It forbade any person holding office under the Crown, of any nature whatsoever, who could not produce a certificate to show that he had taken the sacrament at the parish church. Whoever offended against this law was thenceforth disabled from suing in a court of law, acting as guardian or executor, taking any legacy or deed of gift, or bearing any public office, and was further liable to a penalty of £500.

These acts were unaffected by the Act of Toleration and were naturally felt by the Nonconformists to be a serious grievance. The Occasional Conformity Act of 1711 intensified this grievance. It provided that any person holding any civil or military office who should be found in a conventicle, or in any religious meeting of more than 10 persons, other than one conducted according to the rites of the Established Church, should forfeit the sum of £40, and be disabled for the future from holding any public office.

In 1717 an agitation was commenced for the repeal of these three tyrannical and disabling acts. A bill for the purpose was introduced into the House of Lords by Earl Stanhope, and on a second reading was carried by a division of 86 votes against 68; but on going into committee the clauses relating to the Test and Corporation Acts were withdrawn from the bill and it passed without them. Thus it came about that while the Occasional Conformity Act was repealed at that time it was not till 1828 that a bill for the Repeal of the Test and Corporation Acts received the royal assent.

Still in the interval between 1717 and 1828 several distinct steps were taken in the direction of liberty. In 1742 a dissenter was elected to the office of sheriff of the city of London, and on his refusal to qualify by taking the sacrament he was cited to the Court of King's Bench which decided against his claim to exemption. The Corporation then passed a by-law imposing a fine of £400 upon every person who declined to stand for the office after being nominated, and a fine of £600 upon every person who, being elected, refused to serve. Again and again dissenters were nominated, and as they all refused to serve, fines were levied amounting in six years to more than £15,000, which went toward the erection of the new Mansion House. In 1754 it was resolved to make a stand against this oppressive procedure. After a lawsuit which was traversed from court to court, and which lasted for 13 years, Lord

Mansfield, by his memorable and scathing judgment of 1767, put an end to the iniquity forever.

This gain in the direction of freedom was followed by another in 1779 when Protestant Dissenting ministers and schoolmasters were no longer required to sign the Thirty-nine Articles. In 1812 the Quakers' Oaths, the Conventicle and Five-Mile Acts, which till then had remained on the statute book, were repealed, and the Free Churches were placed, in respect to legal protection from disturbance during times of public worship, on an equality with the Established Church.

The repeal of the Test and Corporation Acts in 1828 was followed by the great Reform Bill of 1832 which did much to introduce the rule of the middle class in English society. The result was a large accession to the strength of Nonconformity, both political and social. Their influence entered more fully into the stream of the national life. They were found taking active part in Parliament and in municipal councils, the national universities were thrown open to them in 1871, and as the result of a recent religious census it was found that quite half of the worshipping population of the country were in attendance on the Nonconformist churches of various denominations. It may be well to add to this historical sketch of the older Nonconformity a brief reference to the laterborn but powerful religious society known as Wesleyan Methodism, which taking its rise in the 18th century, has gone on developing and consolidating ever since. Its internal history is largely that of a struggle for greater freedom and an increased representation of the laity in the government of the Church. Neither Wesley himself nor the other early leaders in Methodism believed in democratic government in ecclesiastical affairs, and continued resistance on their part to the extension of the lay element in the Conference led to one secession after another, these separating bodies forming sister communities. Still while working with more breadth and democratic freedom they remained loyal to the doctrines held by the great founder of Methodism and to the ecclesiastical system he had elaborated. These various off-shoots are known as the Methodist New Connexion, the Primitive Methodists, the Bible Christians, the Wesleyan Reform Union, the United Methodist Free Church, and the Independent Methodist Church. Notwithstanding these successive secessions and some occasional disasters the original Wesleyan Society has shown marvellous vitality, elasticity and resource. While in 1816 in Great Britain and Ireland there was a membership of 241,319, according to the latest minutes of Conference that membership has risen to 565,088. If we add to this the number of members belonging to the various branches of Methodist outside the main body, to the Foreign Missions, to the French Conference and to the South African Conference we reach a total of 1,217,081. If again to this the membership in Australia, in the United States and in Canada, according to the latest information, we arrive at a grand total of 7,870,730. For the due care of this large body they have an

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ordained ministry of 49,113, and a band of lay preachers numbering 102,608.

Passing from Wesleyan Methodism to the Free Churches generally it may be mentioned that these various bodies of Christians outside the Established Church have in recent years entered into a sort of federation without sacrificing their separate self-government. This federation is known as the National Council of the Evangelical Free Churches and consists of representatives of the local Councils of the Congregational and Baptist churches, the Methodist Churches, the Presbyterian Church of England, the Free Episcopal churches (including the Moravians), the Society of Friends, and such other evangelical churches as the National Council may at any time admit.

Bibliography.—Early History up to the Death of Queen Elizabeth.—The principal authorities for this period are: 'The State Papers, Domestic'; Strype, 'Memorials' (6 vols.); 'Annals' (7 vols.); 'Lives' of Cranmer, Parker, Whitgift (reprinted, Oxford 1812-1828); 'Zurich Letters,' (Parker Society, 4 vols.); Neal, 'History of the Puritans'; Marsden, 'Early Puritans'; Child, 'Church and State under the Tudors'; Dexter, 'Congregationalism of the Last Three Hundred Years'; Burrage, 'The True Story of Robert Browne' (1906).

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From 1688 up to the Present Time.—Stanhope's 'Reign of Queen Anne'; Burnet's 'History of his Own Time'; Calamy's 'Own Life'; 'History of the Dissenting Deputies' (1813-14); Halley's 'Puritanism in Lancashire'; Wilson's 'History of the Dissenting Churches'; Bogue and Bennett's 'History of the Dissenters'; Crosby's 'History of the Baptists'; J. J. Taylor, 'A Retrospect of the Religious Life in England'; Skeats's 'History of the Free Churches' (2d ed.); Stevens's 'History of Methodism'; F. Storr Turner, 'The Quakers'; Bost's 'History of the Bohemian and Moravian Brethren'; University Tests Abolition Act, 34 and 35 Vict. c. 26:16, June 1871.

JOHN BROWN,

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30 (c). **Great Britain—English Roman Catholics.** *History.*—The Roman Catholic Church in England is descended from those who in the reign of Elizabeth refused to accept the Reformation (q.v.) and remained in communion with the see of Rome. Nearly all the English bishops were included in this number, and were deprived of their sees, and stringent laws were made with a view to enforcing conformity with the established religion. Notwithstanding these, however, and

the fact that they were frequently put into execution, the number of those who adhered to the Roman Catholic faith was, for a time, very considerable. No form of ecclesiastical government was instituted at first, as hopes were entertained of a national reunion with Rome; but in the meantime, in order to perpetuate a succession of clergy, several colleges were established on the Continent, in which also the laity obtained their education. Chief among these was the college at Douay, in Flanders, founded by Cardinal Allen in 1568. Others were in Rome, Paris, Saint Omer, Seville, Valladolid, Lisbon, etc., several owing their origin to the well known Jesuit, Father Parsons. Most of these still exist, some on their original sites, while others, having come to an end during the French Revolution were re-founded in England, for the laws against Catholic schools had then been relaxed. It was undoubtedly due to the English colleges abroad that the Roman Catholics in England were saved from extinction.

Early in the 17th century, when the hopes of reunion had become remote, an attempt was made to form a proper ecclesiastical government for the Roman Catholics; but it was not until the reign of James II. that affairs were put on a permanent footing. England was then divided into four "districts"—the Northern, Western, Midland and London—each under the government of a bishop called a "Vicar Apostolic." This means that he was, by a kind of legal fiction, bishop of an Asiatic see "*in partibus Infidelium*," and he ruled his actual "district" with authority delegated directly by the Pope. Thus the first "Vicar Apostolic" was nominally Bishop of Chalcedon. A similar arrangement was made a little later in Scotland. And all the colonies having no ecclesiastical government of their own, were considered as belonging to the "London District," so that in early days, the Roman Catholics of North America were under the London "Vicar Apostolic." The beginnings of the present American Roman Catholic hierarchy date from the time of the War of Independence. In England the government by "Vicars Apostolic" continued until the establishment of the hierarchy in 1850; in Scotland it lasted until 1878.

After the brief reign of James II., new penal laws were enacted against Catholics, and the time which followed may be considered the low water mark of Roman Catholicism in England. The hopes they had placed in the Stuarts had failed, and the outlook seemed dark and dreary. There were numerous defections about that time, and hardly any converts were made to replace them. The only centres where the Catholic religion could be regularly practiced were the country seats of the old Catholic families, and in London the chapels of the various Roman Catholic ambassadors.

Towards the end of the 18th century, however, there were signs of better times for them. The penal laws were mitigated by Parliament in 1778, and practically abolished by a second Act in 1791, after which Catholic chapels began to spring up in many of the larger towns, and a certain number of conversions were made. Roman Catholics were still, however, disquali-

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fied from sitting in either house of Parliament, and were under many other civil disabilities. These were not formally removed until the Act of "Catholic Emancipation," obtained by the agitation of O'Connell and the Irish in 1829.

Three events of later time must be briefly alluded to, as having had a permanent effect on the state of English Catholics. One was the French Revolution, which had a double effect. In the first place, it drove back to England the numerous communities of English monks and nuns, who had settled abroad during penal times, and by accustoming the people in England to their presence amongst them, prepared the way for the rapid multiplication of such institutions in later times. In the second place, it caused some thousands of French priests to take refuge in England, where they were received with marked hospitality, and considerable sums both of private and public money were apportioned to their relief. Most of them indeed returned to France on the signature of the concordat between Napoleon and the Pope in 1801; but a certain number remained in England, and founded missions or other Catholic works, some of which still continue. The second event to be alluded to was the great immigration of the Irish after the potato famine in 1845-9, which was the chief cause of the rapid increase of the Catholic congregations at that time and later. The third was the Oxford Movement (q.v.), which though it did not have such a great effect numerically speaking, nevertheless brought over men of standing and influence who have left a lasting mark on the Church. The names of Newman, Manning, Faber, Ward, Oakeley are only some of many that might be mentioned in this connection.

Present Ecclesiastical Organization.—At the present day the Roman Catholic Church in England is ruled by an archbishop of Westminster, and 15 suffragan bishops; and Scotland by two archbishops and four suffragans. The titles of the English sees were expressly chosen to be different from those of the Established Church, though the latter have since adopted three of the Roman Catholic titles—Liverpool, Birmingham and Southwark. Each diocese has a chapter, though there are no resident canons: they are chosen from among the senior clergy of the diocese, and meet at stated intervals. There have been four archbishops of Westminster—Cardinal Wiseman (1850-1865); Cardinal Manning (1865-1892); Cardinal Vaughan (1892-1903); and Archbishop Bourne since 1903. The new cathedral at Westminster was begun under the direction of Cardinal Vaughan in 1895. It is in the Byzantine style, the architect being the late Mr. J. F. Bentley, who died during its construction in 1902. Although yet far from finished, it has already cost over £200,000.

Since the abrogation of the penal laws more than a century ago, mission churches have rapidly multiplied throughout the country, and few towns of any importance are now without one. Some have been built by individual rich Catholics, and are good specimens of architecture: for example, the church at Arundel, built by the Duke of Norfolk in 1873, or that at Cambridge, built by Mrs. Lyne Stephens in 1890; and a certain number of handsome churches

have been built by subscription, a prominent instance being the Oratory at Brompton, opened in 1884. Moreover, the influence of the elder Pugin, who was a Roman Catholic, is largely visible in the churches set up during the early days of the Gothic revival. Nevertheless, the large majority of Catholic churches bear evidence of the poverty of that community as a whole, and have been built with the sole view of securing a maximum amount of accommodation at a minimum of cost.

In their practical working the missions do not differ much from parishes, though they are not canonically constituted as such. The clergy, being unmarried, live together in a house or "Presbytery." They are supported entirely by voluntary contributions. For the most part they lead laborious lives, ministering to the wants of their people, most of whom belong to the poorest classes. There is also a large section of the clergy known as "Regulars," including Jesuits, Benedictines, Dominicans, Franciscans, as well as the modern Redemptorists, Passionists, and other similar congregations. They commonly live in monasteries or large houses; but in the present state of England they often find themselves obliged to undertake the care of missionary churches, like the secular clergy. The total number of priests in England is about 3,400, serving 1,600 churches, chapels or stations.

The Laity.—From what has been said, it will be seen that the Roman Catholic laity belong to three very heterogeneous groups: (1) The hereditary English Catholics, consisting of a number of county families, and in some few districts, such as Lancashire and parts of Yorkshire, and elsewhere, some of the working classes; (2) Converts, or children of converts, of whom there are usually a certain number in most town missions; and (3) those who are Irish, or partly Irish, by descent, who form the majority of the congregations, many of them belonging to the poorer classes of the population. At the present time there are 41 Roman Catholic peers, and 49 baronets, many of them of course being Irish. The total number of Catholics in England and Scotland is said to be about two millions. The prejudices of former times are steadily dying away, and Roman Catholics in general live on good terms with their neighbors. They intermarry to a certain extent, but such "mixed marriages," as they are called, are discouraged by the ecclesiastical authorities and a special permission is requisite for each. Many Roman Catholics may now be found occupying prominent positions on county councils, boards of guardians, or other public bodies. In politics, owing to the composite nature of the body, they are divided, almost every shade of political opinion being represented amongst them; but in general it may be said that while the majority, including almost all the Irish, sympathize with the Liberal party, many of the upper class hereditary Catholics have in recent years become strong Conservatives. When Catholic interests are at stake, however, those of all political views unite on a common platform.

Education.—Very remarkable energy and perseverance has been shown in providing elementary schools for Catholic children, and there

is one attached to almost every mission. In spite of past difficulty and poverty, they have usually been carried on very efficiently. Training colleges for the supply of Catholic teachers, both male and female, exist in various parts of the country. There are numerous poor law, reformatory and industrial schools. In the provision of secondary day schools Catholics are less well off, though there are a certain number of efficient ones in some of the chief towns; but the boarding schools for the upper classes are on a very large scale in proportion to their numbers. The chief ones—Stonyhurst, Ushaw, Beaumont, Downside, Ampleforth, Old Hall, and others, are all equipped fully up to the standard of modern requirements. Some of them are descended from the English colleges on the Continent which were broken up during the French Revolution; others, as for example Cardinal Newman's school at Birmingham Oratory, have been founded in more recent times.

Until a few years ago, Roman Catholics were forbidden to attend the National universities; but in 1895, in response to a petition from the laity, the law of the Church was relaxed, and there are now over a hundred Catholic undergraduates at Oxford and Cambridge. They are scattered in the various colleges, and mix freely in the general life of the university; but there is in each case a centre, where lectures on Catholic subjects are given periodically, and there is a Catholic Debating Society both at Oxford and at Cambridge.

Convents, Charities, etc.—One of the features of Roman Catholic life in England during the last 50 years has been the rapid multiplication of convents, which now number over 700. In a large number of cases the nuns devote themselves to the work of education, either in the parish (primary) schools, or by conducting a secondary school of their own, either for boarders, or day scholars, or both. Others work among the poor, or undertake the care of the sick or the aged, or the unfortunate, while a certain number belong to "enclosed" orders, and give themselves to a life of prayer. Many other homes, orphanages and "rescue" societies deserve to be enumerated; nor ought we to omit at least a mention of the Catholic Truth Society, for printing and distributing cheap Catholic literature among the poor, in these days an essential provision for Catholic life.

Bibliography.—For details of the present state of Roman Catholics, see 'Catholic Directory,' published annually under authority.

The following books may be consulted on the history of the Roman Catholics in England, from their point of view: Dodd's 'Church History of England' (Dodd's real name was Rev. Hugh Tootell. His history was published 1737-42); Tierney's 'Dodd' (The notes of Canon Tierney form a very valuable addition, and make this practically a new book; but it breaks off at about 1640, and was never finished. It was published in 1839-43. Both editions of Dodd are often met with in second-hand catalogues); Lingard's 'History of England'; Sander's 'Rise and Growth of the Anglican Schism' (Lewis's translation [1877], the Latin original [1585] having run to over 30 editions);

Challoner's 'Memoirs of Missionary Priests, 1577 to 1664' (1st ed. 1741-2; many times republished); Berington's 'State and Behaviour of the English Catholics from the Reformation to the year 1780' (London 1781); Butler's 'Historical Memoirs of English and Scottish Catholics'; Milner's 'Supplementary Memoirs.' (These two books formed part of a long and acrimonious controversy on Catholic affairs between Bishop Milner, Vicar Apostolic of the Midland District, and Charles Butler, the distinguished lawyer, who on the passing of the Emancipation Act in 1829 became the first Roman Catholic K. C. Butler's Memoirs appeared in 1819, and Bishop Milner wrote to correct what he considered misrepresentations of Butler. Both books are still fairly commonly to be found); Husenbeth's 'Life of Milner' (1862); Flanagan's 'History of the Church in England' (1857); Olliver's 'Collectanea' (1857); Ullathorne's 'History of the Restoration of the Catholic Hierarchy' (1871); Mazière Brady's 'Annals of the Catholic Hierarchy' (1877); Foley's 'Records of the English Province S. J.' (8 vols. 1877); 'Records of English Catholics' (edited by Knox); vol. I., 'Douay Diaries'; II., 'Letters and Memorials of Cardinal Allen' (1878-82); Amherst's 'History of Catholic Emancipation' (1886); Morris' 'Catholic England in Modern Times' (1892); 'The Catholic Church During the Last Two Centuries' (Lord Braye's Prize Essay 1892); Bernard Ward's 'Catholic London a Century Ago' (1905); Gillow's 'Biographical Dictionary of English Catholics'; Wilfrid Ward's 'Life and Times of Cardinal Wiseman' (1897); Purcell's 'Life of Cardinal Manning' (1896; a book full of inaccuracies, but containing much valuable documentary matter).

BERNARD WARD,

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30 (d). Great Britain—Judaism. *Historical Summary.*—Though the statements as to the presence of Jews in Roman and Saxon England are more or less legendary, it is tolerably certain that William I. brought a number of Jews with him from Rouen to England. Under the Normans, the Jews enjoyed some privileges; they developed a communal life of culture and distinction; but they were practically restricted to financial pursuits as a means of livelihood. Henry I. granted them a charter, but at the coronation of Richard I. serious massacres occurred in London and elsewhere, especially at York, where the ordeal of martyrdom was heroically endured. The "Exchequer of the Jews" was then founded to preserve the Jews from some of the effects of such riots and to enable the Crown, as chief partner in the Jewish money-lending business, to secure its share of the gains. By the middle of the 13th century the Jews were chattels of the king, and their unpopularity on religious grounds was increased by the power they gave the king to obtain a revenue independently of barons and people. In 1275 the *Statutum de Judaismo* forbade the Jews to lend money, and as there was no other function for them in feudal England, their expulsion followed as a matter of course in 1290.

GREAT BRITAIN — JUDAISM

For the next three and one-half centuries a few Jews visited England from time to time; Queen Elizabeth had a Jewish physician. Toward the middle of the 17th century a number of Marano merchants came to the front in English colonies and in England itself. These men, who had escaped the Spanish Inquisition by assuming an outward garb of Roman Catholicism, now boldly asserted themselves as Jews, and in 1655 Cromwell, as a result of the Whitehall Conference of that year, connived at the open resettlement of a Jewish community in England. But two centuries more were to pass before the English Jews obtained full civil and political emancipation. In 1753, Pelham prematurely passed a naturalization bill, which he was forced to repeal next year. The struggle recommenced in 1830. In the years 1828-9 Protestant Dissenters and Roman Catholics were relieved of most of their disabilities. But the Jews were still excluded from Parliament, from membership of the University of Oxford, and from degrees and posts of emolument in the University of Cambridge. Nor could they occupy high posts in the army or navy. Political emancipation was won in 1858. In 1870, following on the senior wranglership of a Jew, the University Tests Act conferred full scholastic rights on the English Jews. In 1858 Baron Lionel de Rothschild took his seat as a Member of the House of Commons, and in 1885, his son, Sir Nathaniel de Rothschild was raised to the peerage—the first Jew so distinguished. Since 1858, many English Jews have sat in Parliament; there has been a Jewish Master of the Rolls; and in the Civil, Military and Diplomatic services a goodly array of Jews has become prominent.

Statistics.—In 1290 the number of Jews who left England amounted to 16,000. At the Restoration of Charles II. there were about 40 Jewish families in London. The increase was slow in the 17th century, but toward the end of the 18th century there was a larger immigration. Colquhoun estimated the Jewish population of London as 20,000 at the beginning of the 19th century, which would bring the total for the British Isles to about 25,000. This estimate is probably too high, for it is doubtful whether there were more than 60,000 Jews in the country before the Russian immigration of 1881. Mr. Jacobs calculated that in 1901 there were nearly a quarter of a million Jews in the British Empire, of which number 160,000 were in the British Isles. Mr. Isidore Harris conjectured (*'Jewish Year Book,'* X, 229) that in 1905 the total Jewish population of the United Kingdom amounted to 227,000 (of whom 140,000 were resident in London); and for the whole of the British Empire he assigned a total of 350,000. For the United Kingdom, this estimate makes the Jewish population 5 per cent. of the total population. All these estimates are conjectural.

Organisation.—Since the dispersal of the Jews from Palestine in the first centuries of the Christian era, the organization of Jewish communities has been almost invariably on an independent congregational basis. Each congregation in the mediæval period constituted an independent unit. Sometimes there would be a combination of these units for certain purposes, as in the famous Council of

Four Lands in Poland (c. 1550-1750). In the pre-expulsion period in England, there were officials who bore the title "Presbyter Judæorum" and who were the acknowledged leaders of the whole Anglo-Jewish community. Such officials were closely connected with the royal finances in so far as they affected the Jews, and were more or less responsible for assessments of talliages. When the Jewish community was re-established in the 17th century, the old congregational system was restored. There was first the Sephardim or "Spanish and Portuguese" Congregation which for long took the first place in the guidance of the whole Jewish life of London. Founded by a body of men distinguished alike for culture and commercial capacity, this congregation gave to English public life many a noble son. They bore a considerable part in developing Colonial trade. This congregation, whose present Bevis Marks Synagogue was consecrated in 1701, was governed by a Mahamad or Council of Elders with an ecclesiastical head or Haham. The Mahamad claimed and exercised considerable power over all the individual members. Gradually, however, the leadership passed into the hands of the Ashkenazim or "German" Jews. At first each German congregation was completely independent, and this condition continued with more or less completeness till 1870 when the United Synagogue was founded. A large number of Metropolitan Jewish congregations are constituents of this united body, but the Sephardim have maintained their complete independence, and besides a few German congregations of old foundation which have remained outside the Union, there was established in 1841 a West London Synagogue of British Jews which introduced some ritual reforms and placed itself (as it still remains) in an independent position. The increase of foreign Jews had, however, led to the formation, especially since 1880, of a considerable number of smaller East End congregations outside the Metropolitan Union. These were "federated" in 1887. It is difficult to define the exact condition of the Jewish communal organization at the present time. The Chief Rabbi is the official head of the great bulk of the congregations of the British Empire, but except for statutory powers conferred over the constituent Synagogues of the United Synagogue by the Act of 1870, the influence of the Chief Rabbi depends on the voluntary acceptance of his jurisdiction by the various congregations. As to the rest of the communal organization, it does not differ from that found in other Jewish centres all the world over. The distinctive mark of Anglo-Jewish arrangements is perhaps the tendency to centralization. In Germany and in America there are Rabbis for every separate congregation; in England there are "Ministers" who preach and teach rather than Rabbis who exercise judicial functions. But there are many indications that the centralization is in process of breaking down. Certainly the organization of the English Jews on its religious side is now in a transitional phase. On the other hand, charitable and philanthropic organization is in a condition of first-rate efficiency, and men of such ability, public spirit, and philanthropic nature as Lord Rothschild are readily acknowledged as lay heads of the community.

GREAT BRITAIN — EDUCATION

The Communal Life.—Cromwell re-admitted the Jews unconditionally, and though the acquisition of political rights was a slow process, the English Jews were never subjected to restrictions of the Ghetto type. On the other hand, the fact that emancipation in England was gradual and not sudden gave the English Jews a training in civic adaptability which had rather exceptional consequences. The Jew easily assimilates, but in England assimilation was not accompanied with any wide-felt desire to forsake Judaism. The English Jews who have taken the lead in serving the state have on the whole been identical with the English Jews who have served the synagogue. The Disraeli family was an exception that proves the rule. But while English Judaism thus gained in coherence and stability by the fact that the leadership of the community was in the hands of its chief men of affairs, the communal life suffered some loss of idealism. English Jews have, indeed, consistently taken the lead in dealing with crises in the fate of the Jews of the world, but on the whole, communal life was respectable rather than brilliant. The institutions which resulted were, however, striking examples of practical philanthropy. The Board of Guardians for the relief of the Jewish poor (founded in 1859) occupies a high place among institutions of its class. It not only prevents the Jewish poor from falling on the rates, but it takes an enlightened view of the aims of poor-relief, fostering self-help by a carefully organized system of loans and emigration. Another characteristic institution is the Jews' Free School (founded 1817). This is probably the largest school in England, and it has served the cause of education while at the same time providing a friendly atmosphere for the children of alien parents. Considerable changes have followed on the increase of foreign Jews. The whole communal life has been vivified. In the first place, the presence of these Jews for the first time made evident a passing wave of anti-Semitism which culminated in the futile Alien Bill. Anti-Semitism has no deep roots in England, but the anti-Alien agitation did undoubtedly rouse the Jews of England to a sense of their responsibilities. Again, the Zionist and Territorial schemes introduced some of the previously lacking idealism. The absence of Jewish Mission deprives the Jews of a powerful driving force. But there is one important Jewish missionary society—a society of Jews with a mission to Jews. The Anglo-Jewish Association (founded 1871) has, under the enlightened presidency of Mr. C. G. Montefiore, had its horizon widened partly by the Hirsch Colonization Scheme which is directed in part by the Anglo-Jewish Association, and partly by the revived interest felt in the Jews of the world in consequence of the propaganda of Dr. Herzl and Mr. Zangwill. The Russian persecutions had considerable influence in the same direction. The general result has been that the leadership of the community is passing from the men of affairs to the idealists, and though there would be serious danger were this process carried too far, there can be little doubt that the change is on the whole fraught with advantage. As another token of present-day idealism may be instanced the initiation of

a literary revival. English Jews have not played a foremost role in the promotion of Jewish learning. While the 'Dictionary of National Biography' was edited for the larger part by a Jew (Sidney Lee), and the British Academy was founded by another Jew (Israel Gollancz), though Jews have filled professorial chairs at the Universities and though there have been two Jewish R. A.'s, the literary performances of Jews in the field of specifically Jewish learning have been insignificant. But a new spirit is now discernible, or rather the old Jewish spirit has invaded the English Jewry. Thus, without enumerating the many institutions which are the just pride of the community, without detailing the eminent service to the State rendered by English Jews, it may be said generally that the practical spirit which has so long directed the current of Jewish life is now receiving a long-needed infiltration of idealism. In no part of the world is there greater hope for Judaism. Fullest toleration is enjoyed and more than toleration, sympathy. Fullest civic and political rights are the possession of English Jews. And above all there is undoubtedly a genuine affection for Judaism. Official Judaism is not in a thoroughly healthy condition, but there is in the general mass of Jews a sturdy confidence in the religion and an immovable hope in its power to civilize and save. Sobriety, good citizenship, devotion to the state, and a practical appreciation of all humane virtues are being once more touched by the fire of enthusiasm. Judaism is not only a creed and a code, it is a life. In England this principle seems likely to reassert itself. The English Jew is pre-eminently an Englishman, and he may become at one and the same time pre-eminently a Jew.

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31. Great Britain — Education. Introduction.—For a history of the early days of British Education the hour has not yet come. Much of the spadework of research has yet to be undertaken. Even the origin of the two ancient universities remains obscure. The records of secondary schools, with very few exceptions, do not begin before the Reformation, though the claim of King Edward VI. to be a patron of education has been shown to rest rather on having attached his name to a portion of the older foundations, of which a considerable number were destroyed under the Chantry Act of 1547. Elementary education was a matter too humble to receive much definite permanent

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record, and probably, as in Scotland till recent years, it was frequently given in the same schools in which the elder children were being prepared for the universities. Neither taxes nor rates were levied for education before the 19th century (to speak in general terms), and the only method of maintaining any permanent educational institution was by means of endowment. Considerable sums were devoted to this end in the reign of Elizabeth, and, after the troubles of the Civil Wars were over, there was an outburst of endowment in the end of the 17th and beginning of the 18th centuries.

ENGLAND.

Elementary Education.—Two important factors in spreading elementary education were the Society for Promoting Christian Knowledge, founded in 1698, and the Sunday School movement, crystalized in the foundation of the Sunday School Society in 1785, and representing largely the Evangelical Revival of the 18th century.

The educational work of the Society for Promoting Christian Knowledge was in 1811 transferred to the "National" Society (The Society for Promoting the Education of the Poor in the Principles of the Established Church), which for the time being was devoted to carrying on Schools on the "Madras" monitorial system, as organized by Dr. Andrew Bell. In 1808 a Society, known subsequently as the British and Foreign School Society, was founded, chiefly by Nonconformists, to establish schools on an almost identical system which had been developed by Joseph Lancaster. The provision of Elementary Schools in England and Wales was thus in the beginning almost entirely the work of those connected with religious bodies, of which the Church of England was numerically and financially by far the most important. These Voluntary Schools, aided since 1833 by gradually increasing grants from government, continued to hold the field alone until 1870. Since the introduction of Board Schools, supported by rates, at that date, and even since 1902, the Voluntary Managers have gone on raising considerable sums of money, which, however, of late years, have been devoted chiefly to building and maintaining the fabric of their schools.

The religious difficulty in English elementary schools has thus been involved in their very origin.

It was not till 1833 in the first Reform Parliament that the State came to their aid. In that year the House of Commons made a money grant of \$100,000, which was apportioned between the two Societies, and it was not till 1839 that the Government Education Department for directing the administration of the grant was established. The grant was gradually increased, and between 1850 and 1860 rose from \$725,000 to \$4,000,000 for Great Britain. In 1880, it was \$12,500,000 for England and Wales only, and now is over \$55,000,000 for elementary education. The years between 1840 and 1860 were years of great expansion. The population, which in 1801 had been under nine millions in England and Wales, by 1861 numbered twenty millions. The Government Education Grants greatly encouraged the clergy of all denominations, and schools sprang up in all directions. In 1861 the economists took fright, and severe mechanical

tests were applied to the system of grants by the "Revised Code." Payment was to be made only on the results of individual examination of every pupil, in reading, writing, and arithmetic. Undoubtedly some check was needed on a system advancing so rapidly and with teachers so ill prepared as many were for their profession. But the method adopted was disastrous, and its cramping influence is felt in the traditions which exist to-day, years after the last relics of this method of payment by results have been abolished.

By 1870 it was quite plain that, magnificent as the efforts of the Churches had been, nothing short of a national local system could provide the necessary schools, especially in the large towns. The Elementary Education Act of that year enabled boroughs and parishes to form School Boards, with powers (if necessary) to levy a rate for building and maintaining Schools in addition to the building grants and other grants from the State. The Central Education Department had after due investigation to declare what school accommodation was needed in each district. If in any case it were not duly supplied, they might order the formation of a School Board; and in case of further default appoint such a School Board themselves. Existing Voluntary Schools were to receive the Government Grant, but no aid from rates. They might still give such religious instruction as they thought fit. In the Board Schools no religious catechism or religious formulary distinctive of any particular denomination was to be taught. This regulation is known as the Cowper-Temple Clause, from the name of the member who introduced it as an amendment. Subject to this a School Board might give in its schools such religious instruction as it thought fit, or might abstain from giving any. As a matter of fact, except in some places in Wales, where the religious instruction is given in Sunday Schools, plain Bible lessons are given by the ordinary teachers in all these schools with very few exceptions. Any School Board might make by-laws enforcing the compulsory attendance of children between five and thirteen, subject to a conscience clause, and a number of School Boards were established for this purpose only. In 1876 attendance was made compulsory in *all* districts by the establishment of School Attendance Committees where no School Boards existed. The provisions for compulsory attendance have been strengthened and diversified by four subsequent Acts, and are further complicated by conflicting Factory and Workshop Acts, so that the whole now urgently need consolidation. In 1891 fees were abolished in most schools, a process nearly completed since 1902.

The Act of 1870 aroused the most intense opposition at once from the Church party and the extreme Nonconformists. The latter were disappointed of their hopes of a uniform national system, the former found themselves in competition with a rival subsidized by the State. The greatest activity prevailed on both sides in providing additional schools. Between 1869 and 1876 provision was made in elementary schools for 1,600,000 additional children, and of these two-thirds were in voluntary schools, toward the cost of which only one-fifteenth was paid in Government building grants. Educational en-

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thusiasm was not, however, the sole factor; in many cases the chief ratepayers realized that they could build and maintain the schools far more cheaply by voluntary subscriptions than under the administration of a School Board, and large corporations such as railway companies, were willing to contribute to voluntary schools for similar reasons. And in point of fact, the annual cost of education per child in Voluntary Schools in 1902 amounted to \$11.50, and in Council Schools to \$15. By 1902 the number of Board Schools was 5,878, as against 14,275 Voluntary, but they were educating 2,344,000 children, as against 2,546,217 in Voluntary Schools. These figures sufficiently indicate that the voluntary system had proved wholly inadequate in the large centres of population, but still prevailed in the majority of country villages.

By the end of the century the time was ripe for further legislation. Secondary education was in chaos, and it was imperative that it should be coordinated with the elementary system. The development of the latter moreover was in many places completely at a standstill and unlikely to be further improved under existing conditions. The tendency to local self government had rapidly increased during the past few years. In 1888 the Local Government Act established County Councils, and in 1894, by another Act, District and Parish Councils were constituted. In 1889 the Technical Instruction Acts had authorized the County and Borough Councils to supply technical instruction, and the vast majority of them were spending for this purpose the large sums of money handed over to them in 1890 by the Local Taxation (Customs and Excise) Act. They had thus already some experience as education authorities. On the other hand, the requirements of the Education Department (which in 1899 had been reorganized as the Board of Education) had been steadily growing, in accordance with modern ideas of education, so that the Voluntary Schools began to find it impossible in most cases to obtain the money requisite to keep them efficient.

Accordingly in 1902 a fresh Education Act was passed. By this every County, every County Borough (*i. e.* to speak roughly, city of more than 50,000 inhabitants), and (for elementary education) every urban district of over 20,000 inhabitants and every non-county borough of over 10,000 became local Education Authorities, and all School Boards were abolished. Each new authority must appoint, according to a scheme approved by the Board of Education, an Education Committee, which they are bound to consult, and to which they may delegate all powers for education except that of raising money. The Voluntary Schools must give their religious teaching in accordance with the terms of their trust deed (if any), and it is under the control of their managers. They appoint and dismiss their own teachers, subject to the consent of the local authority which pays them. The voluntary managers are responsible for the upkeep of their buildings, subject to an allowance from the authority for internal fair wear and tear, but the local authority is bound to maintain and keep the schools efficient otherwise, at its own expense. Each Voluntary School is managed by a body of managers, usually six, of whom two-thirds are appointed under the trust

deed, amended by Order if necessary, and one-third by the local authorities. Board Schools are now known as Council Schools. The managers are appointed by the local authorities. In counties two-thirds are appointed by the County Council, and one-third by the local District or Parish Council. To the managers such powers are at present delegated as the central local authority thinks fit. London was excepted from this measure but received an analogous Act in the following year.

Unsatisfactory as many of the provisions of this Act are to the politician and to the religious controversialist, there can be no doubt that from the point of educational administration over the country as a whole, it has brought about great progress, an advance proportionately almost as great as the Act of 1870. Even in those cities where there was already a strong progressive School Board, it has concentrated the powers for higher as well as for elementary education in the hands of one authority, has materially increased the grant, and has given considerable powers over the standard of accommodation and of staffing in the elementary schools. In the Counties moreover it has abolished the small rural School Boards, whose sole object was to reduce expenditure, and has placed in charge an authority which can apply a reasonably high and uniform standard of efficiency in staffing, in school accommodation, in hygiene, in school material, in school attendance, and even in the small, but important matters of school cleaning and offices.

It is not yet possible to obtain statistics for the whole country which are up to date, but, to take a typical large county, the following figures relating to Staffordshire speak for themselves:

STAFFORDSHIRE EDUCATION COMMITTEE.			
Number of Elementary Teachers:	1902	1906	
Certificated	789	954	
Uncertificated	581	722	
Average Attendance	85.5	90.9	
Number of Departments in which was taught:			
Cookery	28	62	
Manual Instruction or Handicraft	14	33	
School Gardens	4	89	

In 1902 in 79 departments in Staffordshire the principal grant was paid on the lower scale on account of some lack of efficiency; by the end of 1906 it is reduced in only one case.

Notice has been given of the intention to provide 6,575 additional places in elementary schools in this county, and steps are being taken to carry out the whole of this work as quickly as possible. In most cases the new accommodation is to replace schools which are wholly unsuitable.

Of these items, the increase in School Gardens is the only abnormal figure; the remainder are fairly typical of what has been done in ordinary progressive counties. They are far from reaching the ideal, but they mark a very real progress. They represent moreover the first fruits of a new movement whose efforts have not yet had time to reach their full effect. Of the three years during which this advance has been made, at least a year and a half had to be devoted to preliminary organization.

On the other hand the Act of 1902 has met

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with the most violent antagonism from the enemies of the Voluntary School system. It is urged with good reason that complete maintenance from the public funds should be accompanied by full public control, that no denomination should be allowed to have instruction in its tenets given at the public cost, and that in any parish where there is only one school, the children of the minority, who have no alternative but to attend it, are liable to suffer from a stigma attached to the exercise of the conscience clause. Nonconformist teachers moreover find it difficult to obtain engagements in Church Schools or places in training colleges of which very few are undenominational. The Church party on the other hand are not unreasonably unwilling to allow only undenominational religious instruction to be given in schools which they have built, largely at their own expense, for denominational instruction, and claim a right to have such instruction for their children.

At the moment this is written the news comes that the negotiations for a compromise over the Bill of 1906 have broken down. That measure aimed at complete popular control of the school, and the abolition of tests for teachers. The provisions to secure freedom for religious instruction were extremely complicated and teachers were forbidden to give denominational instruction, even if they desired to do so. A long controversy is evidently before us, in which very little will be heard of true education. The more simple the ultimate measure is, the more permanent is the settlement likely to be. But the general feeling of the country is against a secular solution.

Probably the large bulk of the people, apart from the Roman Catholics, would be quite ready to accept religious instruction under the Cowper-Temple clause. Meanwhile there is among politicians a growing weariness of the whole squabble, and among enthusiasts for education an entire distrust for politicians as educational reformers.

Training of Elementary Teachers.—In England and Wales the reform probably most needed is to improve the general education and the professional training of teachers in elementary schools. Out of 165,000 teachers employed in 1904-5, only 78,000 were fully certificated, and of these less than 43,000 had been to a training college. Of the residential training colleges in 1905, four-fifths were denominational, but this does not apply to the day training colleges. The total number of teachers in training was only 7,522. Pressure is being brought to bear on local authorities to improve their staffing, and to provide more training accommodation. Perhaps, however, the best work done as yet has been in laying the foundation of this reform by re-organizing the education of pupil teachers. Formerly a child in an elementary school was allowed to act as probationer, then became a pupil teacher in the same school, receiving instruction before and after ordinary school hours from the head teacher only. The pupil teacher then passed or failed to pass, examinations for which it was difficult to obtain any special preparation. The teacher so trained might then well spend the rest of his or her life in the same school. The board now refuses to recognize pupil teachers under 16 (in rural districts 15, with a three

years' apprenticeship), requires at least half time attendance (where it is possible) during the apprenticeship of two years at a centre, which in most cases forms part of a secondary school. Previous attendance at a secondary school is encouraged as far as possible, and all the larger authorities are giving special scholarships for this purpose. The barrier between elementary and secondary schools is thus being broken down to an un hoped for extent, and pupil teachers so educated will be better able and far more likely to go on to the training colleges. Of 140,216 adult teachers in public elementary schools in 1905, 33,855 or 24 per cent were men.

English Secondary Education.—The best defence of English secondary schools at any rate during the past century, is that they have successfully educated a large number of men of high character and ability who have served the nation well in political and administrative life, not only in England, but all over the world. There was, however, till quite recently, nothing that could be called a system. Each school utilized or abused its endowments and its opportunities, and the abuses were very slowly revealed by the inquiry of royal commissions, and still more slowly corrected. Although inquiries began in 1818 under Brougham, it was only in the "sixties" that the reports of the commissions on the great "Public Schools" (nine in number) and on the endowed schools led to two acts of reform, the Public Schools and the Endowed Schools Acts, and under these most of the abuses of endowments have been brought to an end.

But in the leading English "Public Schools" (*i. e.* the leading secondary schools for boys, and principally for boarders), a considerable measure of reform had come in early days from within. The twin names of Arnold and Rugby are best known, but the Rugby reform was in part inspired by Winchester, and great names are not wanting to Eton and Harrow which with the many glaring defects they possessed at that period were relatively efficient. From Arnold and his successors, Temple and Percival, influence radiated and few schools failed to become different, whether by attraction or repulsion. Thring at Uppingham, Vaughan at Harrow, Cotton and Bradley at Marlborough, Bradby at Haileybury, were mighty instruments in "changing the face of education all through the public schools of England."

Not only have science and modern languages been introduced, as well as opportunities for the arts and manual instruction, but the teaching of Greek and Latin has to a great extent been remodelled. Physical development, which was always encouraged in those schools by games, has been pushed to a degree which now makes against intellectual interests. Nearly all the so-called first grade schools are boarding schools, and consequently the corporate life gives far greater scope to the influence of masters and of boys, and thus to education in the widest sense, than is possible in day schools. For good or evil, the effects are more marked, and on the credit side must be set that independence and self reliance which the best schools produce. On the other hand over-organization and "spoon-feeding" seem at the present time to be a real danger.

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The first chief influence of modern science on the schools' curricula came from a separate government department founded in 1836 as a school of design. In 1853 this was reconstituted as the Department of Science and Art, largely by the influence of Prince Albert, and partly as a consequence of the first international exhibition held in London in 1851. This department began to hold examinations and make grants for teaching of science and art, and ultimately extended its subsidies to schools recognized by it as "Organized Science Schools," in which regular courses of instruction in science were given. In 1900 the new Board of Education absorbed the Department of Science and Art, and also the Education Department dealing with elementary schools. It thus became the sole central authority, and in 1901 began to give grants to approved secondary day schools with regular courses. It has also in connection with these grants developed a very full and valuable system of inspection conducted by its own staff. In 1902, as already mentioned, the county and country boroughs became education authorities, the minor localities possessing only concurrent jurisdiction with the counties in higher education. Since 1902 these authorities almost without exception have made considerable annual grants to the secondary schools in their areas, and a marked improvement is already visible in the efficiency of the schools, and the length of attendance of the pupils. These grants of course are given almost entirely to the smaller schools. The endowments and fees of the first grade "Public Schools" render them independent of such assistance and consequently of the Board of Education.

But if there has been great development in boys' schools, what is to be said of the education of girls? With the awakening of the middle of the century to the defects of the teaching of girls, came the establishment of numerous high schools, and were it not from the lack of endowments, and the relics of a tradition against spending much on girls' education, their secondary schools in receipt of State and local grants would soon be as numerous and fully as efficient as those for boys.

Mixed Schools.—There has been a certain amount of experiment in this direction, and prejudice has to a large extent been dispelled, but on the whole the best English opinion seems inclined to the view that, other things being equal, it is preferable to educate girls and boys in separate schools. There are, however, many places unable to support two separate schools, and in these co-education is being tried with some success. But there is no likelihood of its ever being tried in the older public schools, where the school age does not end before 18 or 19, and this precedent will probably always militate against it in smaller schools.

Curriculum of Secondary Schools.—So far as boys' schools are concerned, not very much liberty is really left to initiate startling reforms. Pupils are prepared for the universities, for civil service, or for army and professional examinations, and it is these which really prescribe the subjects. In addition to the actual university courses most of the universities have followed the example of Oxford and Cambridge in establishing "Local Examinations" and the

"Examinations of the Joint Board" for the benefit of pupils still at school. These tests, especially when joined with inspection, have done most valuable service. The chief difficulty, however, is that there is no correlation of these examining bodies, and there are no definite principles upon which they are agreed, more especially with regard to the examinations to qualify for admission to professions.

Other Secondary and Technical Education.—The Science and Art Department, already mentioned, held various examinations and gave grants to classes and prizes to pupils. But it was the Technical Instruction Act of 1889, and still more the Local Taxation (Customs and Excise) Act of 1890 which encouraged local authorities to spend money on so-called "technical" subjects. The list of these subjects finally included, I believe, everything secondary except the classics. Even Shakespeare is said to have been taught under the head of "Commercial English." These powers brought the councils of counties and boroughs and urban districts into the field as education authorities, and in addition to their grants to secondary schools and their scholarship schemes, they did much to prepare for their future work in secondary education proper. The chief effect of the limitation to "technical" instruction was to encourage the teaching of science subjects, which had never before received proper recognition. This limitation to "technical" instruction was entirely swept away in 1902, when the local authorities received power to administer all higher education as well as elementary. In the last 15 years a large number of "Institutes," "Schools of Art," and "Technical Schools" have been built or enlarged. Marked progress has been made in the education of those persons who during the day are engaged in trades and professions. The quality and scope of the teaching have been considerably improved, and the chief need at present is to secure the attendance of lads and girls who are leaving the elementary schools and to induce them to complete well-arranged courses of not less than three or four years' duration.

Board of Education.—Much of this progress both in elementary and secondary education is undoubtedly due to the increased enlightenment and energy of the Board since its re-organization and above all to the present permanent secretary, Mr. R. L. Morant, who was specially promoted to this post in 1903, and has shown himself to be in the first rank of educational administrators. Not only have the different departments been re-arranged on wise and appropriate lines, but the whole of the codes and regulations have been entirely rewritten from an educational standpoint. A Board of Education Library was started in 1895 under the charge of a director of special inquiries. The series of invaluable special reports issued by Dr. M. E. Sadler, and his successor Dr. Heath, have been of first rate importance, not only to British education, but to students all over the world.

English Universities may perhaps most conveniently be divided into two classes, the old and the new. In no branch of education has there been a more rapid or startling development than here. In 1826 there were only Oxford and Cambridge, the traces of whose origin are lost in the early Middle Ages. In 1906 no less than six

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new universities enjoy a prosperous existence, while there are other university colleges which may hereafter develop into universities themselves.

The New.—Manchester, Liverpool and Leeds, federated in 1880 as Victoria University, have recently acquired separate charters. Birmingham, established in 1880 as Mason College, became a university in 1900. Durham, founded in 1832, has been constituted more on the lines of Oxford and Cambridge, except for its association with the college at Newcastle. London, which received its first charter in 1836, was afterward for many years merely an examining body, but at last in 1898 received a new constitution enabling it to embrace all the chief institutions for higher teaching situated in and near the capital, and to distinguish between its internal (or taught) and external (or merely examined) students. It is difficult to do justice to the splendid energy and the magnificent generosity which has founded and worked most of these institutions—qualities which can be more easily paralleled among the universities of America. These institutions are new, they are efficient, they do well a work which needed doing. But as the object of educational study, they are less interesting than the universities of Oxford and Cambridge.

The Old.—It would be hard to explain to a stranger the way in which Oxford and Cambridge have in the past entered into the life of the whole country, attracting to themselves not only the sons of men of rank, position and leisure, but also poor and able lads likely hereafter to make their way both at home and in the world at large. It is probable that no Cabinet will ever again be composed almost exclusively of men drawn from these two universities, but it is equally improbable that any Cabinet will ever lack them altogether. Oxford and Cambridge supply a very large part of that executive civil service to which England owes so much, and of which so little is heard. In nearly every country parish the squire and the parson can still exchange reminiscences of a university common to them both, for in the past the size of the country and of the population rendered it possible for two universities to gather together, widely speaking, the representatives of the governing and teaching classes. If these young men did not always get much learning, at least they grew from boyhood to manhood in an atmosphere of discipline and among their equals. The influence moreover of the beautiful buildings set in an environment of groves and lawns and quiet streams, and the association of national history and literature, were a factor in their education which nothing else could supply. Oxford "as she lies in the moonlight, spreading from her towers the enchantments of the Middle Ages," and Cambridge, her equal and rival, have an influence still reaching deep and wide into the character of the nation.

It must not, however, be supposed that cautious reforms have not adapted these universities to the changing needs of the time. By the beginning of the 19th century examinations were instituted, the best of which have probably done the work possible to examinations as well as it has ever been done. Royal commissions in the middle of the century, and again in 1877 led to

the revision of the mediæval statutes and to the abolition of many obsolete restrictions and privileges. All religious tests were finally abolished in 1873. The time has perhaps come round for a new inquiry, but the particular methods of teaching by lectures and by tutorial work are carried out with a thoroughness and care which it would be difficult to surpass. In the past 50 years nine distinct new courses have been added to the curricula both for Oxford and Cambridge graduation, besides new subjects for which diplomas are granted. Museums and libraries, laboratories, institutes and workshops have been freely erected, and only a lack of money prevents further developments. For it is a curious feature of their constitution that in both places eight-ninths of the property belongs to the individual colleges in which the men reside and one-ninth only to the universities themselves.

The Rhodes Bequest.—The most striking departure of recent years has, however, been due to a son of Oriel College, Cecil Rhodes, who bequeathed an income of some \$170,000 a year to be given in 60 scholarships to the Colonies, 102 to the United States, and 15 to Germany, all tenable only at Oxford. The result of this policy it is premature to forecast, but the experiment so far has met with success. Oxford has welcomed the scholars, and they have at once found their feet and seem cordially to recognize the distinctive character of the benefits which the university has to offer without being blind to its limitations.

University Extension.—Besides the direct work of the universities, old and new, notice should be taken of their pioneer efforts in developing education by means of lectures. This has proved specially valuable in the development of some half dozen university colleges, of which Reading is the most conspicuous example.

Higher Education of Women.—The education of women has met with many difficulties in England, but except for the refusal of degrees at Oxford and Cambridge, practically all desired privileges are now everywhere open to them. In the newer colleges and universities they are received on the same terms as men, except in certain medical courses. In Cambridge they have two colleges, in Oxford four and they are admitted to all such teaching as they require and to all examinations. Degrees alone are withheld and actual membership of the universities which would involve a share in their government.

WALES.

Introductory.—Of the four quarters of the United Kingdom, Wales has made the most rapid progress. In the middle of the 19th century her elementary education had probably the worst equipment; her secondary schools were inadequate and inefficient; while in higher education she possessed only the recent foundation of Lampeter, which was then little more than a theological college.

Elementary.—The Welsh elementary schools have always been under the administration of the English Board, and, considering the inaccessibility of the wilder parts of the country, have made at least a proportionate progress. Nowhere has more difficulty arisen in the administration of the Education Act of 1902, and a section in the Bill of 1906 provided for the estab-

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lishment of a separate Education Department for Wales. Teachers and schools probably suffered to some extent, but the future progress of Welsh education is in any case assured. Wales has the educational advantage of being a bilingual country to a greater extent even than Ireland, and this has long been fully recognized in her schools.

Secondary.—Wales, while sharing in the educational inquiries and reforms of England, made in 1889 an enormous step in advance. In that year she obtained the Welsh Intermediate Education Act, under which small joint education committees were established in all the counties and county boroughs, and by this means an admirable system of county secondary schools for boys and girls was established. In 1897 a Central Welsh board was created to provide for examination and inspection of the different schools which had been created and organized out of the rates and grants placed at the disposal of the joint education committees. Of these county schools, 93 obtained a grant in 1905.

Universities.—In university teaching Wales in a single generation has rivalled the provision of Scotland. A training college was founded in 1862, and the first university college at Aberystwyth in 1872. In 1883-4 university colleges were established at Cardiff and Bangor, and the annual grant they received from Government was before long extended to Aberystwyth. In 1893 they were incorporated in the University of Wales, which has since been extended so as to include Lampeter, which, however, has the power of giving separate degrees. Women have been admitted from the beginning to the Welsh university colleges and the university.

SCOTLAND.

Preliminary.—A love of education is in the blood of the Scot. He will get his education and profit by it, and he will utilize any existing means to this end. This is the history of education in Scotland, and accounts for the virtues and most of the defects in the Scottish system. In the old days the elementary school led direct to the universities, and the universities were hampered by doing the work of secondary schools. On the other hand there were few boys of ability and character who could not get the best education in the country, and the sacrifices they made had a large share in the success so many of them ultimately achieved. To-day the path is easier, the opportunities greater, and the instruction has progressed with the times.

Elementary.—John Knox laid down a scheme for the establishment of a grammar school in every town, but most of the funds intended for the endowment passed into other hands. In 1696, however, a system of schools was established by statute, the landowners being bound to provide a school-house, and a salary for the teacher, in every parish. The salary was small, and the exceptions numerous, but a rate-aided system was actually organized, and owing to the cheapness of the university system, and the frugality of the country, much excellent work was done. The conditions of the teacher and the method of his appointment were gradually improved by statute, though no State aid was forthcoming till 1833. The first Parliamentary

Grants for elementary education applied equally to Scotland, which was under the English Board of Education until 1872. In that year the first education act for Scotland was passed. In spite of the multiplicity of her religious denominations, Scotland was ready to accept a universal system of school boards, who were left entirely free to teach what religious formulæ they pleased in their schools. Compulsory attendance between five and thirteen was enforced throughout the country under a maximum penalty amounting to as much as five dollars, a sum not reached in England until 1900. A special committee for education for Scotland was now created, which in 1885 was given a separate secretary.

In a general sketch it is impossible to point out the numerous small differences between the Scottish and English systems. Scotland was earliest to escape from the revised code and payments by results, uniform curricula and mechanical inspection; first to provide special treatment for blind and deaf children; first to secure free education, and to improve her physical training. A Scot may be pardoned if he sums up the main results by saying that the outlook is generally more from the education standpoint, the teacher more fervid and better educated, and the children more eager for knowledge. The religious difficulty has been entirely avoided, and that in the chief home of religious controversy. A mention should be made of the celebrated Dick bequest which in the northern counties has done much to improve the quality of the teaching by subsidies to better qualified teachers. This also has materially assisted children from elementary schools ultimately to fit themselves for a university education. A bill to introduce certain reforms into the organization of the system and increase the powers of the school boards, has twice been introduced into Parliament, but has not yet been passed, though Scotch members now appear fairly agreed on its merits.

Secondary and Higher Education.—In spite of Knox's comparative failure there were burgh schools and academies established in nearly all the burghs by 1866, and the existing endowments, though capable of better use, had never been greatly abused or misappropriated. A leaving certificate has been organized with much success by the Education Department, which holds the necessary examinations, as well as inspecting higher class schools.

The science and art teaching formerly conducted under the auspices of South Kensington was in 1897 transferred to the charge of the Scotch Education Department. Technical Instruction in the United Kingdom may be said to have had its rise at Glasgow in Anderson's Institute, but the cheapness of the universities and greater facilities for general education has always prevented much specialization on purely technical subjects.

Universities.—In no respect has Scotland fared better than in the number and accessibility of her universities. Saint Andrews (1411) with three colleges, Glasgow (1450), Aberdeen (1494) with two colleges, and Edinburgh (1582) afforded every opportunity that the poorest student could wish. It was necessary to attend lectures, but there was no residence in college, and the long summer vacations were used by

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poor students to earn their fees for the winter. The chief reforms which have been carried have been to raise the minimum requirements for graduation, to make fees uniform, to admit women, to provide adequate buildings, and to endow new subjects of instruction. The greatest liberality has been shown in providing funds for the last two of these purposes, and the universities are now well housed and well staffed. Mr. Andrew Carnegie has given \$10,000,000, the income of which is to be spent equally between the endowment of certain branches of study and research, and paying the fees of poor students. The latter half of the bequest seems unlikely to benefit the character of a class which would formerly have found such assistance unnecessary, but the value of the portion applied to the endowment it would be difficult to exaggerate.

IRELAND.

Introductory.—In Ireland the state of education has been most deplorable, and is still far behind the rest of the kingdom. This is due to poverty, to politics, and to religious bigotry. The difficulties caused by bigotry and politics when a Protestant minority was in power in the earlier half of the 19th century caused those who were responsible for elementary education to steer a cautious and ineffectual course; a different set of difficulties due to the same causes, working through the priesthood and the politicians, prevent any thorough reform to-day. And always the grinding poverty of the nation as a whole has hindered the schools and the teachers from being brought up at any given time to the standard which prevailed in English or in Scottish education.

Elementary Education.—Till the end of the 18th century Catholic schools were illegal, and existed chiefly as "Hedge Schools." Considerable funds were spent, chiefly in encouraging proselytising institutions. In 1831, however, the present system administered by the Board of Commissioners of National Education in Ireland was introduced, and has continued without any sweeping changes to this day. These schools are supported almost entirely by Government Grants, and are placed each under a patron, who appoints a local manager. There is no rate raised for elementary education, the whole grant coming from Imperial funds. All schools are open nominally to all denominations, and religious instruction must be given separately, but practically all but a very small proportion of the schools are attended solely by Catholics or by Protestants respectively. Compulsory attendance is still extremely limited in its scope, and the percentage of average attendance in 1904 was only 65.7 throughout the country, as against 85.98 for Scotland and 85.70 in England and Wales. The standard of school accommodation is very low, and an amount of discomfort and squalor exists in the elementary schools which it would have been impossible to find anywhere in England for many years past. Thus in 1904, one thousand schools stood in need of having out-offices provided. The number of teachers who had been trained was 7,210, as against 5,071 untrained, or 58.7 per cent. The quality of the less capable teachers, however, compares very unfavorably with the standard in England.

The most hopeful feature in Irish education in recent years has been the establishment of the Department of Agriculture and Technical Instruction, created in 1899, which, beside administering technical instruction, has acted as the adviser of the National Commissioners with regard to teaching agriculture and elementary science in the elementary schools, and in enabling the teachers to obtain instruction in these and kindred subjects. The report of the Belmore Commission, in 1898, showed the most deplorable backwardness in all modern developments of primary instruction. Progress is being made, though it will naturally take years to overcome the neglect and ignorance of ages, and it is to be hoped that the managers of the schools will co-operate with the teachers and the central board, and that a healthy feeling as to school attendance will gradually spread throughout the country.

Secondary Education.—The chief agent in secondary education in Ireland, apart from the board which administers the endowments, and before the establishment of the Technical Instruction Board, has been the Commissioners of Intermediate Education. In 1873 this board was founded and endowed with five million dollars from the funds of the disestablished Church of Ireland. In 1890, \$250,000 a year were added to this income. The money, however, has been awarded on the results of examinations, and before the system was reorganized in 1902 the whole scheme was one of payment-by-results run mad. The reform is still far from satisfactory, but a change at any rate has been made in the right direction. The Technical Instruction Board is, however, doing most admirable work and is being well seconded by the county councils.

University Education.—The Elizabethan foundation of the University of Dublin and Trinity College, which practically form one body, has throughout its career had a marked success as a Protestant university on the lines of Oxford and Cambridge. Tests were abolished to a great extent in 1793, and finally in 1873, but the Catholics have never as a body accepted Trinity as a national institution. The three Queen's colleges, founded in 1845, have had even less success in this respect, and the Queen's University, in which they were amalgamated, was replaced in 1879 by the Royal University of Ireland, which is in itself merely an examining body. At the same time it is true that the fellowships of the Royal University are used practically as a means of endowing the Catholic University College in Dublin, as well as the Queen's colleges. The question of establishing and endowing a Catholic university or of creating a National university, of which Trinity College should or should not form an integral part, has been debated again and again. Catholics refuse to be content with less than a Catholic university; English Liberals and Non-conformists cannot see their way to spend public money on endowing a denominational institution. It is difficult to see how this deadlock can be overcome under existing conditions, but in the meantime the country is suffering severely.

Higher Education of Women.—Women have been admitted to the examinations and degrees of the Royal University from its foundation, and

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have since been allowed to attend the lectures of the Queen's colleges. For a long time Trinity College and the University of Dublin would not admit them either to lectures, examinations, or degrees. The examinations were conceded first, the lectures followed; and now women who have been at Oxford and Cambridge, and require a degree for teaching or other purposes, obtain it freely at Dublin, which thus drives a flourishing business at the expense of its less progressive rivals.

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31 (b). Great Britain—Medicine. Registration.—With few exceptions medical practitioners in Great Britain are registered by law. This legal recognition, and this alone, allows them to recover their charges in a court of law; to practise medicine, surgery, and midwifery under recognized titles in the United Kingdom, and (subject to local law) throughout the Empire; to hold medical appointments in the government services, in emigrant and other vessels, in asylums, hospitals, and other institutions and capacities under local authorities, and in benevolent and similar societies. This registration alone qualifies them to sign certificates of birth and death. Here is the dividing line. Unregistered medical men may practise, and they may hold appointments in hospitals entirely supported by voluntary contributions. But they cannot recover charges in courts of law; they are debarred from public appointments; they may not wilfully and falsely use the title of physician, surgeon, apothecary, doctor of medicine, or any description implying legal registration; above all, they may not sign death certificates.

Anyone may claim to be registered after a minimum course of five years' study on payment of \$25 (£5) after passing a written and oral examination of high standard qualifying for one of the recognized diplomas, and taking out one such either in medicine, surgery, or midwifery. The qualifying examinations must be in all three subjects. There is no state examination. The lowest actual standard in England is probably that of the Society of Apothecaries, which is about equal to certain Irish and Scotch diplomas; and even this minimum is a high all-round practical test, rarely, if ever, maintained in other countries. American and other foreign and colonial graduates in medicine are usually admitted to the final examination for the diplomas of the Royal Colleges and Society of

Apothecaries, on showing that they have obtained degrees from universities recognized by these boards and have passed a preliminary examination in general education equal to that required in England. Particulars may be obtained of the Secretary to the Examining Board, Examination Hall, Victoria Embankment, London, W. C.

Value of English Diplomas.—The commonest is the combined license and membership, respectively, of the Royal Colleges of Physicians and Surgeons, given after a series of examinations by a conjoint board of the two colleges. With or without this diploma or that of the Apothecaries' Society, distinction in England is obtained by taking out a degree at one of the universities, Oxford or Cambridge, London or Durham, Manchester (The Victoria), Sheffield, Liverpool, Birmingham, Leeds. The highest distinctions are the Doctorate in Medicine and Mastership in Surgery of Oxford, Cambridge, and London universities, the Membership of the Royal College of Physicians of London, and the Fellowship of the Royal College of Surgeons of England. For each of these a further examination, considerable fees and certain other evidence of professional position and training are required, beyond the original qualifying test; and the Fellowship of the Physicians' College is elective and in a high degree exclusive, with a view of maintaining the highest ideal standard, both professional and general, amongst the body of consulting physicians. *In Scotland.*—By one series of examinations held both in Glasgow and Edinburgh, a student obtains the licenses of the Royal Colleges of Physicians and Surgeons of Edinburgh and of the Faculty of Physicians and Surgeons of Glasgow. With or without this qualification, distinction is obtained by taking out a degree at one of the universities,—Saint Andrew's, Glasgow, Aberdeen, Edinburgh,—or the Fellowship of the Edinburgh Royal Colleges or Glasgow Faculty. *In Ireland.*—The Royal Colleges of Physicians and Surgeons of Dublin hold conjoint examinations for their licenses, the Apothecaries' Hall of Ireland holds a separate series of examinations, and distinction is obtained by taking out a degree at the older university of Dublin (Trinity College), or at the Royal University of Ireland, or the Fellowship of the Dublin Royal Colleges.

Professional Titles.—The relative attainments of any practitioner at the outset of his professional career may therefore be to some extent gauged by the letters after his name. University qualifications, M.B., M.D., B.Ch., (or B.C., or B.S.), M.Ch., (or M.C., or M.S.), besides the social and general education they have involved, count as a rule for more than the conjoint qualifications, M.R.C.S., L.R.C.P. in England, L.R.C.S., L.R.C.P. (Edin.), L.F.P.S. (Glas.) in Scotland, L.R.C.P.I., L.R.C.S.I. in Ireland; and these again for more than the English and Irish apothecaries' licenses, L.S.A., L.A.H. English qualifications are commonly reckoned of a higher standard than Scotch or Irish. Besides the initials already given are those for midwifery, viz., at the Irish universities, B.A.Ob., M.A.Ob., and Irish Royal Colleges, L.M., and those for public health (Hygiene or State Medicine), and tropical medicine, viz., D.P.H. (Diplomate),

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D.S.Sc. (Sanitary Science), D.Hy., and B.Hy. (Hygiene), M.D. Stat. Med. (State Medicine), and D.T.M. (Diplomate). Dental degrees are independent of the medical profession. There are no degrees in other special subjects, although special subjects are allowed to be taken in the thesis or examination for certain M.D. degrees.

Councils.—The General Medical Council (address 209 Oxford St., London, W.) is constituted under Act of Parliament. It consists of 34 medical men of eminence, holding office each for five years, five nominated by the Crown with the advice of the Privy Council, 12 by the Universities, Royal Colleges and Apothecaries' Hall in England, 7 by those of Scotland, 5 by those of Ireland, and 5 by direct vote of all registered medical practitioners in the United Kingdom. There are Branch Councils for England, Scotland, and Ireland. The duties of the council are to establish and preserve the roll of registered practitioners. They have to regulate by deputed inspectors the standard of examination and other tests required for the qualifying diplomas; but direct pressure can only be exerted on examining bodies through the Privy Council. It is theirs to publish the register every year; and to hear penal cases, with a view to removing from the register the name of any man judged "guilty of infamous conduct in any professional respect." Such cases are first investigated by the Branch and then by the General Council, which is for this purpose practically a court of law, its decisions not being open, however, to revision in any other court. Infamous conduct includes "covering" or the employment of unqualified assistants; it does not include the adoption of any theory of medicine or surgery.

Professional Training.—Education for admission to the register is largely in the hands of the Universities and other examining bodies already mentioned. But in London medical education is carried out entirely in connection with the large general hospitals supported by endowment or voluntary subscriptions, included only recently and as yet only formally as constituent colleges in the remodelled London University, which, until 1900, was but an examining body. The colleges of medicine in London, 12 in number, are the schools of the following hospitals: Guy's, Saint Bartholomew's, London, Saint Thomas's, Saint Mary's, Saint George's, Middlesex, Charing Cross, Westminster—with University College and King's College, both having hospitals attached, and the London School of Medicine for Women, attached in 1877 to the Royal Free Hospital in Gray's Inn Road. These hospitals contain from 165 beds (Royal Free), to 927 beds (the London), with large out-patient departments. Most of the medical, surgical, and pathological work is carried out by students under the supervision of a visiting staff; the resident appointments are held for short periods only, by recently qualified students, who are the best men of their year and are given much responsibility and actual major surgical practice. It is this practical experience under supervision, this training by responsibility, that gives a special value to the English training, as compared for instance with that in Scotland or on the Continent. Each medical school is a separate organization,

to which students look as their professional home usually from the beginning to end of their professional lives, the organization in many instances being completed by a residential college, clubs' union, athletic ground, and periodical gazette or journal. This system involves a subdivision of the otherwise unique clinical material of London; but it leads to a healthy rivalry, closer contact of students with their responsible work, and greater individual attention to their needs by the lecturers and visiting staff. An attempt is at present being made to concentrate the teaching of elementary medical studies in London in *that part of the Imperial Institute now given over to the London University*; but University College, King's College, and the larger London Schools are unlikely in the near future to curtail their own spheres of educational activity, even for the sake of an Imperial ideal in medical education. In the provinces education is conducted by university schools of medicine in connection with some large local general hospital, that of Durham University, for instance, being at Newcastle. But Oxford and Cambridge Universities, being situated in small towns, encourage their students to do their clinical work at the London hospitals. They are content with having given them as thorough and liberal an education as possible in all the medical sciences, including laboratory pathology, and they trust, by a final examination in which they can impose their own tests of efficiency, after two or three years in a London hospital, to ensure the proper development of sound professional ability from the groundwork of principles which they have laid. This mixed university and London training, a system of only 20 years' growth, is being gradually developed by Prof. Clifford Allbutt at Cambridge and Prof. Osler in succession to Sir John Burdon-Sanderson at Oxford, and is already recognized as providing an exceptionally sound education. All the other schools give an almost complete course of medical education. This, however, may be supplemented by private schools and special hospitals; and a course of instruction in infectious diseases at the large fever hospitals of the Metropolitan Asylums' Board or elsewhere is obligatory for all diplomas. It is a subject of regret to many in the present day that the old system of training by apprenticeship is dead, the law allowing no qualified practitioner to employ unqualified assistants, and the General Medical Council not reckoning any period into the requisite time of study unless spent at a medical school. After passing the examination in general knowledge, the minimum length of the course of training is five years; the average is over seven. The fees for the course of teaching, examinations and final diploma vary in general from \$1,000 to \$1,500 (£200 to £300).

Medical education in Scotland and Ireland is on similar lines, the extra-mural school of the Royal Colleges at Edinburgh and the Rotunda Hospital for Midwifery at Dublin having exceptional influence.

Post-graduate study is arranged for separately in each hospital; but in London a combined hospital ticket is now obtainable, from the London Post-graduate Association, Examination Hall, Victoria Embankment, London, W. C. (\$42½ for 3 months, \$75 for 6), giving ad-

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mission to the clinical practice of the chief hospitals. Comprehensive courses of post-graduate study are well organized in London at the West London Hospital, and at the Polyclinic; special courses are arranged for at the London and Liverpool Schools of Tropical Medicine and at most of the special hospitals. Research work and bacteriological and chemical analysis are carried out at all the above institutions, and virtually at all fever hospitals. Research and supply of vaccines and antitoxins are the sole aim of the Lister Institute of Preventive Medicine in Chelsea, with its fine farm at Elstree, Herts. Bacteriological and chemical analysis are efficiently organized as a commercial concern by the Clinical Research Association, and in certain private laboratories.

Voluntary Organisation in Practice.—A considerable fraction of the best students in every year secure junior positions in their hospitals or in the medical schools attached to them, and work their way up by degrees to consulting practice, mainly with the help of their student-friends and pupils in general practice. The majority of those qualified find their way into the provinces, often after spending a few years in junior positions at London or provincial hospitals, in trips abroad as ship's surgeon or otherwise, in assistantships to practitioners; and they in most cases buy the good-will of an established practice or partnership at one to two years' purchase. In such positions they are isolated, attached by little more than sentiment and a dining club to their old hospital, officially organized only in their occasional vote for a direct representative on the General Medical Council. Voluntarily, however, they organize themselves to a considerable extent for relief and for protection, as in the British Medical Benevolent and Lancet Relief Funds, The Society for the Relief of their Widows and Orphans, the benevolent and educational work of Epsom College, and various associations for medical defence. Still more, a thorough scheme of organization has been established by the British Medical Association, with its 20,000 members, grouped systematically into geographic divisions throughout the Empire, each with its divisional council and its delegates to the Annual Representative Meeting, which recommends the policy to be carried out by the partly co-opted, partly nominated Central Council, during the ensuing year. This council works largely through committees, of which the chief are the medico-political, the ethical, and that which conducts the well-known weekly journal. Apart from the protection of professional interests, the association exercises considerable influence by memorials and deputations to government, which otherwise relies for medical advice on the Royal Society, the Royal Colleges of Physicians and Surgeons, and the few medical advisers to government departments.

Women mostly take the license of the Apothecaries' Society in England, the Scotch or Irish conjoint qualification or the degrees of the London and the other newer universities. They are debarred from the English conjoint qualification, and from the degrees of the universities of Oxford and Cambridge. They take little part in the professional organizations, and as yet they practice but little in the United Kingdom, many being trained for the mission field.

Homœopathy.—In England Homœopathy is a specialty practiced without exception by men who possess a legal qualification to practice. They receive their special training, if at all, by post-graduate lectures and resident appointments at the homœopathic hospitals. Of these there are a fine example of 100 beds in London, and 9 in the provinces. Most homœopaths belong to the British Homœopathic Society, founded in 1844, which publishes a quarterly journal. There are also two monthly journals of the cult and a new "British Homœopathic Association" of practitioners and laymen.

Medical Societies, Libraries, Journals, and the Annual Congress form a considerable bond of union. Apart from branches of the British Medical Association, there are 100 such societies in London alone and corresponding numbers in the other chief towns, many being associated with a central body in London, some for general, many for special professional objects. Societies in London mostly meet at 8 p. m. The best medical libraries in London are those of the Royal Colleges, of the Medico-Chirurgical Society, and of the British Medical Association. The chief periodicals are the 'Lancet' and 'British Medical Journal' (weekly); the 'Annals of Surgery,' 'Practitioner,' 'Journal of the Royal Army Medical Corps,' and 'Public Health' (monthly); 'Brain' and 'The Journal of Hygiene' (quarterly); annual report-volumes of the various chief London hospitals; and the annual 'Medical Register' and 'Medical Directory.' The 'Pharmacopœia' is revised from time to time and published by the General Medical Council. An opportunity for the interchange of ideas on all subjects is afforded every year by the Congress of the British Medical Association, held usually in the United Kingdom, but in 1906 in Toronto, Canada.

The Government Medical Services are each separately organized under the corresponding Government Office. The Naval Medical Service includes 520 active and 240 retired medical officers, with its chief hospital and college at Haslar, near Portsmouth; the Royal Army Medical Corps, 1,031 active and 533 retired medical officers, with the new Army Medical College opened in 1907 at Millbank, Westminster; the Indian Medical Service, 747 active and 546 retired medical officers, sharing in the Army Medical College; the Colonial Office employs in Crown colonies several hundred medical officers, who do not hold commissions, but undergo extra training at the School of Tropical Medicine; and the Foreign Office has also a staff of medical men in its service abroad.

Under the Local Government Board, for purposes of the *poor law*, district and workhouse medical officers and public vaccinators are appointed in every parish and union for the most part in conjunction with their general practice, usually in return for very small salaries, to attend to paupers in need of medical attention. The workhouse infirmaries in the large cities are of great size and importance. Under the Local Government Board, too, is organized the *sanitary medical service*. The head of this service is the political President, advised by his medical officer, and by his legal adviser, with the assistance of a staff of legal

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secretaries and engineering and medical inspectors of the highest experience and ability. Local Government throughout the country is in the hands of borough and district councils, each of whom has a sanitary inspector and a medical officer of health, and many of whom maintain isolation hospitals for cases of infectious disease. Powers of supervision are given to County Councils, who, with the advice of County Medical Officers of Health, may report default of District Councils to the Local Government Board. The chain of authority is therefore through the lay authorities, each advised by its medical officer. Some of these sanitary appointments are of little pecuniary value; others of considerable value, demanding the whole attention of the holders; and they are increasing markedly in number, value, and importance. In practice the sanitary service largely depends on the unofficial Royal Sanitary Institute with its annual congress and monthly journal, its courses of instruction, its examinations and its diplomas for school teachers and sanitary inspectors, a body of non-medical men who are the foundation of British sanitary administration. Among other government appointments are those of police surgeon, prison surgeon, factories' surgeon, and inspector of factories and workshops under the Home Office, those of Medical Officer to Schools under County Councils and the Education Office; those to lunatic asylums and fever hospitals under the Metropolitan Asylums' Board and other local authorities.

With these offices and work for insurance and friendly societies, sick-clubs and private nursing homes, the practitioner ekes out his slender earnings.

The numbers on the British Medical Register in 1906 were roughly as follows: London, 6,400; Provincial England, 17,000; Wales, 1,200; Scotland, 3,800; Ireland, 2,700; Foreign and Colonial, 4,700; Naval, Military, and Indian Services, 3,200. Total, 39,000.

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31 (c). Great Britain—Engineering. Engineering as a profession is only partially organized in Great Britain. To understand the present state of development a brief historical statement is necessary.

Historical.—On the military side engineering is and has been thoroughly organized. Fortification and the art of constructing defences are probably as old as society. The Babylonians, Greeks, and Romans showed skill and originality in design and construction which has nowhere been surpassed. From the introduction of the catapult, ballista, and other engines of war amongst the Greeks and Romans mechanical skill likewise received wide and steady development.

Into Great Britain engineering was probably first introduced by the Roman invasion and then languished until William the Conqueror brought with him a large body of engineers.

As gunpowder, cannon, and later muskets replaced catapult, arquebus and crossbow, mechanical skill and ingenuity made steady advance until at the present day the manufacture of war implements and their invention and design have passed to a considerable extent into

the hands of civilians. Military engineers are organized as the Corps of Royal Engineers with their headquarters at Chatham, although it has recently been proposed to remove them elsewhere.

The Artillery is organized in several corps, according as service in the fortress, field, mounted, or on foot, is required. Knowledge and training in a specialized branch of engineering is needed for these services.

Guns and military equipment are manufactured at the Royal Arsenal at Woolwich and at the Royal Small Arms Factories at Enfield and Birmingham, under Army control, and in various factories belonging to civilian firms.

In the Navy engineers have steadily increased in importance as the construction of ships and their working depended more and more upon machinery until under the recently modified regulations it has been arranged that all naval officers whether navigating, gunnery, torpedo, or engineering shall for the first years of their training be educated together, specialization being left to the later years of their course. Engineer officers will therefore rank with other officers of equal standing and be capable of executive command.

On the Civil Side.—The foundation of English Civil Engineering may be said to have been laid by Smeaton (1724–1792). He was the son of an attorney, became a philosophical instrument maker, and subsequently devoted his attention to a study of windmills, canals (for which he made a tour of the low countries in 1754), and lighthouses. He reconstructed the Eddystone Lighthouse in 1756. He was therefore "much consulted in regard to engineering projects, including river navigation, the drainage of the Fens, design of harbors, and the repair and construction of bridges."

Smeaton founded in 1771 the "Society of Civil Engineers," the members of which dined together once a month during the parliamentary session and discussed subjects of professional interest. It still exists under the name of "The Smeatonian Society of Civil Engineers." No records of its discussions have been kept nor published but its foundation shows the earliest step in the direction of organizing the non-military engineers into a profession in Great Britain.

Partly contemporary with Smeaton was James Watt (1735 to 1829). He was trained as a mathematical instrument maker, but was prevented from practicing by the trade as not being fully qualified, and therefore he was granted three rooms in the University of Glasgow where he carried on experiments resulting in the creation of the modern steam engine out of the crude pumps of the Marquis of Worcester, Newcomen, Cawley, and Savory. His improvements demanded for their perfect fulfillment mechanical skill and workmanship far in advance of the work of the millwrights of his earlier youth. Out of the millwright he therefore created the manufacturing engineer, and did for the mechanical side of the profession what Smeaton had done for the constructive side, and like Smeaton on the constructive side Watt on the mechanical side was consulted as an authority of the first rank on all important matters.

Watt moreover had, about 1767–1770, a large

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practice as a constructive engineer and surveyor, and prepared plans for a number of canals and harbors, chiefly in Scotland.

As manufactures increased, partly owing to the impetus given to them by Watt's inventions, partly as a result of the industrial development at the termination of the Napoleonic wars, the improvement of means of communication and greater rapidity of transit became of first class importance, and as the roads throughout Great Britain were at the end of the 18th century in an execrable condition we find attention more and more concentrated upon the construction of inland canals and new and improved roads.

The man who more than any other aided in this improvement was Thomas Telford (1757-1834), the son of a Dumfriesshire shepherd and in early life trained as a stone mason. After the construction of a house for the Commissioner of Portsmouth Dockyard he became Surveyor of Public Works for Shropshire and constructed a bridge over the Severn at Montford in 1792. The construction of the Elsemere canal in 1793 led to his being employed in the construction of most of the chief canals in Great Britain, from the Caledonian in 1804 to the Birmingham and Liverpool junction in 1825 as well as the Gotha canal in Sweden in 1810. He constructed and perfected most of the main roads in Scotland, the North of England, and Wales, involving the erection of the Menai and Conway bridges, besides numerous others of less magnitude. He also made many continental roads in Austria, and was also employed in harbor construction.

He lived a bachelor in London at the Salopian Coffee House, afterward the Ship Restaurant, and two years after the establishment of the Institution of Civil Engineers in 1818 he was elected president for life. The meetings were thereafter held in the Ship Restaurant, whither the institution removed from the Kendal Coffee House in Fleet street, its earliest home.

Meanwhile, mechanical road traction, steam barge, and ship propulsion had advanced with the advance of the steam engine and with George Stephenson's triumph at Rainhill in 1829, railway construction had commenced and was fast monopolizing attention as the most efficient and rapid means of communication. The names of Brunel, Clarke Russell, Whitworth and a host of others claim recognition in the rapid advance of engineering both at sea and on land which now followed, but enough has been said to enable a grasp of the rise of the profession and the lines of its gradual development to be realized.

The progress in organization of the profession which has since taken place has been due firstly to the commanding position in the profession attained by the Institution of Civil Engineers and secondly to the development and organization of engineering scientific education which has taken place in the Technical and University Colleges and Universities throughout the kingdom.

Institution of Civil Engineers.—This institution founded, as already said, in 1818, obtained a Royal Charter of Incorporation in 1828, its objects being—as described by Tredgold in a statement prepared for the Council in applying for a Charter—"For the general advancement

of mechanical science, and more particularly for promoting the acquisition of that species of knowledge which constitutes the profession of a civil engineer, being the art of directing the great sources of power in Nature for the use and convenience of man as the means of production and of traffic in states both for internal and external trade as applied in the construction of roads, bridges, aqueducts, canals, river navigation, and docks for internal intercourse and exchange, and in the construction of ports, harbors, moles, breakwaters and lighthouses, and in the art of navigation by artificial power for the purposes of commerce, and in the construction and adaptation of machinery and in the drainage of cities and towns."

This is the earliest definition of civil engineering and the profession of the civil engineer therefore embraces all non-military engineers who are laboring to "direct the great sources of power in Nature to the use and convenience of man" whatever be the special corner of this wide field of operations to which any individual member may be devoting himself.

During the earlier years of the institution's corporate existence the enormous development in the construction of railways, roads, harbors, docks, drainage, and waterworks led to the not unnatural predominance of discussion on questions of special moment to these branches of the profession in the institution proceedings. The Council was consequently largely recruited from the men of eminence on the predominating side and the civil engineer became in public estimation more and more exclusively identified with the designer and constructor of such works.

With the rapid improvements which have since taken place in machinery and machine processes and with the revolution which has been effected in commerce and in the requirements and mode of life of the people, by the less prominent but equally remarkable achievements of such men as Stephenson, Armstrong, Whitworth, Bessemer, and Siemens, the demands for a greater outlet for the discussion of the mechanical problems of interest on this side of the profession of the civil engineer became more and more insistent and the opportunities available in the existing institution being by many felt to be inadequate, the Institution of Mechanical Engineers was founded in 1847 and was constituted in 1878 as a registered association under the Companies Acts.

With the discovery of the means of practically utilizing electricity for producing light and transmitting power and the consequent extension of its use in all departments of mechanical work a third development took place in 1880, when the Society of Telegraph-Engineers and Electricians which had been incorporated under the Companies Acts in 1883 and from its establishment in 1871 had until 1881 been called the Society of Telegraph Engineers again changed its name to the Institution of Electrical Engineers. Various other societies and institutions have been formed at various dates amongst which may be mentioned the Civil and Mechanical Engineers' Society, the name of which the membership is confined to junior founded on a misconception, the Society of Engineers, and the Institution of Junior Engineers,

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a very active and progressive institution of which the membership is confined to Junior members of the profession.

The Institution of Civil Engineers is thus the parent institution, embracing by its constitution and membership all branches of the profession demanding for entry to its roll (a) practical professional training in works or as an assistant to an engineer; (b) theoretical training as evidenced by the passing of its own examinations held twice a year or by the holding of the degree or diploma of a recognized university or technical college; (c) suitable and strictly defined qualifications for each of its classes of membership or studentship.

It is recognized as the leading professional body and membership of its Council and occupation of its presidential chair to which there is annual election are the most valued of professional distinctions. It can to a certain extent guide and control professional conduct within its own membership but does so with an all-too-sparing hand. To many it appears that the time is ripe for further extension of professional organization and for the application of stricter discipline in regard to what may be called, generally, professional etiquette, and it is the Institution of Civil Engineers which alone has the constitution and prestige which would enable it to successfully deal with such a development.

Beside this great leading institution are the Institution of Mechanical Engineers and the Institution of Electrical Engineers, each representing one branch of the profession only, and demanding professional but not examination qualifications for membership. Most of the members of each of these belong also to the premier institution.

To complete the organization of the profession much remains to be done. There is as yet no state registration enabling the assumption of the name civil engineer (embracing, as has been shown above, engineers of all branches) by unqualified and untrained persons, to be checked and fees and professional conduct to be regulated by a governing body, such as the Institution of Civil Engineers, with the help of the other professional institutions, might organize if they had the necessary statutory powers. The public thus lack the protection to which they are entitled against the employment of unqualified advisers whom they have no sure means of distinguishing from competent engineers. One difficulty in the way of this necessary step being taken would probably be removed if the popular misconception of the functions of a civil engineer were eradicated.

This perhaps is more strongly the case in the United Kingdom than elsewhere, for there it has been the custom, where work involving machinery or engineering construction of any magnitude was required by those who were not themselves engineers, to obtain advice as to the best way to obtain the ends in view, and the best engineering designs to employ, from leading members of the appropriate branch of the profession practicing as consultants. There has thus grown up a body of engineers whose function is to give this advice and draw up the instructions upon which tenders can be obtained from engineers who undertake the construction of the works or machinery involved. Much mis-

conception has arisen in America and elsewhere as to the foundation and value of this method. The consultant is in a position of trust between his non-engineering client and the manufacturer. By clearly defining the requirements of his client, after investigating all the conditions of the problem, he enables competing contractors to estimate their prices upon a fair and uniform basis. On the one hand his duty is to see that his client obtains the best installation and that which most satisfactorily fulfills the conditions of the problem on reasonable terms; on the other he sees that no competing manufacturing or contracting firm is unfairly handicapped by a misunderstanding of the problem and by the unfair competition of a rival. Further, his duty is to see that the chosen contractor is not unfairly dealt with owing to the ignorance of engineering possibilities or limitations on the part of his client.

In this capacity, as arbitrator and adviser, the highest qualifications of judgment, independence, integrity, and justice are required of the engineer, and it is of the highest importance that the ranks should be kept purged of any who may usurp these functions without the necessary qualifications and bring discredit upon the profession as a whole. Here statutory powers of control and regulation by a professional body are pre-eminently needed.

Educational Organization.—On this question a brief word must suffice. Engineering schools were first established in London at King's College and University College in the first half of the 19th century. These have been followed by the establishment of other schools in the provinces and in London until a large number now exist in which the scientific bases of engineering are taught in an organized course lasting in general for three years. During that course Engineering Laboratory training at most schools occupies a large portion of the time. Experimental determinations of the efficiencies of various machines and prime movers working under varying conditions, the strength and properties of materials, flow of liquids, etc., are undertaken by the students, and the underlying scientific laws deduced and exemplified.

In some schools engineering manufacturing processes are also taught and workshop training undertaken, but in the United Kingdom it has generally been held that this branch of training is best obtained in the factories of manufacturing firms, and this is the method advocated by the Institution of Civil Engineers.

The University of London has an Engineering Faculty and grants degrees in Science (Engineering), and the University of Cambridge has a Mechanical Science tripos as an avenue to its degrees in arts.

The provincial universities all grant degrees in science on the engineering side. Dublin and Liverpool alone grant a degree in engineering.

The principle upon which such "engineering" as distinct from "science" degrees are generally held to be unsound in Great Britain is that the practical, which is an essential portion of an engineer's training, can not be rightly regulated or judged by an academic body. A professional body such as the Institution of Civil Engineers is alone competent to co-ordinate the two portions of the professional education.

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32. Great Britain—English Society. This paper does not purpose to deal with the history of society in England, or to compare the customs, clothes, and conventions of different centuries;—still less to compile personal anecdotes and present sketches of various social celebrities. To do any of these things adequately would fill a volume. The article therefore merely attempts to give an impression of English society as it exists in the year 1906, and some account of its chief characteristics, influences, and pursuits.

Society in England is very difficult of definition. There are no rules of admission, no graded qualifications, no inevitable exclusions. It is not essential to be well born, or rich—it is not necessary to be refined or clever. The enclosure is a very large one and there are many entrances and many tickets of admission. Certainly the fame of its easy hospitality attracts undesirables from all over the world, and people, who in spite of their vast wealth, have proved too stupid or too vulgar for Paris and Rome, often find a happy home in London; but it is to the credit of society in England that it tries to be appreciative and will always welcome anyone who can amuse or interest or stir it—brains, talent, fame, are keys which unlock every gate, and this hospitality, combined with certain national characteristics, helps to make social life in England, notwithstanding its obvious faults, on the whole vital and interesting.

A clever German woman said once that in her own country she would rather belong to the middle-class, for it contained almost all the people with brains and talent, but that in England there was only one thing to do if you wished to pass your life among interesting people—and that was to get into society. She should have added, from her point of view, that unless she had been gifted with certain qualities, she might have been born a member of one of the greatest families, without attaining this result. Mere rank or birth is not enough—both undoubtedly help, but it is no use being

born within the enclosure unless you are able to walk about in it.

Unlike the custom of many foreign capitals it is not really necessary to be received at Court before admittance, nor on the other hand is the presentation to the King and Queen a sufficient introduction. The presentation is an honor but not a necessity, and except in rare cases, where the reception at court practically intimates to society that some scandal is to be ignored or condoned, carries with it, so far as England is concerned, no social privileges. The influence of the Court is, however, very considerable and confers a certain social position even though it cannot always secure admittance into some coveted circles. For in a sense it may be said that the Royal family is apart, having a circle round it drawn from society, but not itself forming a part of the general throng.

Roughly speaking, English society has always concerned itself with Government and with politics, from the days when the great nobles of the State took sides and fought for rival Kings, to the present time, when the sons of great houses join one or other political party, and when to be a prominent politician is to be a prominent social figure.

In the nearer past, society was divided into hostile camps, following the cleavage of party. Whigs met, talked, played, and danced with other Whigs; Tories with Tories, and the orbits of the two planetary systems rarely crossed. In the year 1906, these divisions hardly exist, and it may often happen that a Minister will find himself at the same table with a Member of Parliament who an hour before was denouncing him as a dangerous enemy to the best interests of his country.

There is a rule that no Member of Parliament when speaking in the House, shall step beyond a certain line drawn parallel to the benches; a necessary precaution once, when passions ran high, and swords might be whipped out at any moment. But now that there is more control, and men do not wear swords, the rule is only a survival whose origin is forgotten. The line beyond which no man may step has been transferred from the floor to the tongue. Even in the days of swords duellists before beginning to fight used to greet each other with elaborate bows and courtesies and, in the same spirit, two men engaged in a bitter struggle can now exchange smiles and laughter at dinner.

These conventions are reflected in the society of to-day, where no difference of opinion, no rivalry, hardly any dislike, is allowed to hamper social intercourse—the bitterest public opponents in politics and letters, the criticized, and the critics meet amiably round tables, and all goes well.

Two characteristics which during the last few years have affected the pace and the color of social life, are restlessness, and love of riches.

The first is fostered by the greater facilities of transit and of communication, which urge even the most quiet people into movement. Routine is almost unknown. The busier a man or woman, the more imperative becomes the weekly change of air, the journey to waters, the visits in Scotland—while life in London itself

is forced to an ever-increasing pace by the telegram and telephone.

The second characteristic, the worship of riches, is the effect of a growing taste for expensive pleasures and displays. London even suffers sometimes from the particular type of American millionaire, who will spend thousands of pounds upon transforming the courtyard of his hotel into a lake, and feeding his friends in gondolas,—but these visitations are rare and hardly ruffle the surface of social life. There are however, permanently in its midst, men who possess special commercial aptitude, but who have no peculiar social qualifications. Their wealth enables them to erect palaces, dine delicately and expensively inside them, whirl about in magnificent motor cars, hire splendid moors and forests, and these people, though they could not have done so fifty years ago, palpably influence modern social life. A standard of luxury and pleasure is set up, far beyond the power of ordinary well-to-do people to attain—some struggle to compete, some acquiesce and give up the effort, but all enjoy what they can of the rich man's table. Every door is open to him; his character, his conversation, his manners are seen through a golden haze—he is asked everywhere—he is flattered and imitated. It may possibly occur to him at depressed moments that he is not quite inside the inner circle; that certain great houses only remember his existence once a year, and that there are always some people, not devoid of influence, who prefer simpler friends, and simpler modes of life. But he will be easily consoled; there will always be the many others, his children will marry what is called the best in the land, and he himself will finally, if his ambition so prompt him, take his seat proudly as a peer of the realm.

Keeping in mind then, these two characteristics,—restlessness and love of riches, a description of the methods of intercourse, and incidentally the pursuits adopted by the pleasure seekers will help to give a more complete picture.

The practice of eating together, it need hardly be said, still obtains, and on the whole, the amount consumed in spite of much that is said and written, varies very little in quantity. It certainly does in quality—French cooks and French dishes have invaded London and the consequent expense and variety make it difficult for small households to compete with the restaurants. The habit therefore of eating simple food at home, and of entertaining friends at the Carlton or the Ritz has taken strong hold. Not so very long ago it was difficult to get a really good and choice dinner except at a private club—now a sovereign or two in the pocket will secure it on any evening of the year. The enormous increase in theatres is a subsidiary effect—a party cannot sit forever round a table, and they drift to some place of amusement. The habit of sitting together and talking is on the wane, "causerie" is becoming a lost art, and in private houses the theatre is replaced by bridge tables, and occasionally by music.

Letters have altered in much the same way as conversation. The old fashioned correspondences, the full, leisurely chronicling of great and small events, has given place to telegraphic

and telephonic communication. Those people who are not in the telephone book inevitably drop out of the busiest ranks of the pleasure seekers, just as those who do not possess motor cars have to abandon the chase after distant golf links and country luncheon parties.

A week's visit in a country house is now a rarity—the longest shooting parties begin on Tuesday and end Saturday, and the throng hurries back to London, or goes on to one of the usual Saturday to Monday hospitalities. But in spite of this curtailment, and in spite of the rush of a week-end party—the country visit remains the best method of intercourse. There is a greater freedom—youths and maidens walk, ride, play games, and in the intervals talk together, and their elders when released from their own athletics and cards can also exchange ideas. Marriages are promoted far better in this way than in the mazes of the dance, and many of the best marriages have been made by girls who are little known in London. This is greatly due to the decay of town life which is gradually setting in—out of door pursuits and games absorb people more and more, and the ease of transit make them able to combine a certain amount of town dissipation with country life. The girls are tall, strong, well-developed, they hunt and play golf and bicycle—they join in whatever may be the game of the moment, with the keenest zest, and improve their figures and their general health, and indirectly the whole physique of the race by this custom. The part which girls and women thus take in the amusements of the other sex, is only one of the many invasions which women have practised. They share to the fullest extent in the work and struggle of their husbands—in politics they take an increasing part, many of them now speaking on political platforms, besides doing humbler work in constituencies. Women, with their gift for detail and their organizing power exert great political influence on all kinds of subjects—an influence which is too impersonal and diffused to be ascribed only to the usual cause. The old Aspasian influence, however, always has existed, and always will, for no change in social methods will diminish or increase the eternal power of sex. The political salon has disappeared, chiefly because of the vast size of political and social circles, but the women who make the right men meet at the right hour, who place the derogatory or the praising word at the auspicious moment, who avert unpopularity or create it, are as powerful as they have ever been. Therefore while women leading social lives certainly read, think, and even work more than they used to, there is no falling off in the efforts after personal adornment. On the contrary, the same thing has happened with dresses as with dishes—both are now made expensively by the French. Probably a smart lady of our day spends three times as much upon her clothes as her mother or grandmother did. This is not only because she lives in a more extravagant age—it is also because she does many more things for which she has to be appropriately dressed, and because the standard of technique in this difficult art has been gradually rising. A smart English woman will often spend from £2,000 to £3,000 a year on her outfit, which has to contain for town life, morning gowns, after-

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noon gowns, dinner and ball gowns—even House of Commons gowns, and for country life, golfing, shooting, and walking skirts, driving coats, motor coats, furs, tea gowns and evening gowns. To all these must be added the endless supernumeraries of veils, gloves, handkerchiefs, scarves, umbrellas, parasols, walking sticks, hats, shoes, boots. Every new pursuit in a social woman's life means a new dress. Skirts hamper athletics in any case, therefore they must be specially made—the gown in which it is fitting to open a bazaar looks vulgar in a drawing-room, the evening gown is not quite in tune with the House of Commons, and so on. The men are spared the greater part of these trammels, but they would not be pleased to see their wives lacking in any of the so-called essentials.

People often wonder whether smart society is more or less immoral than it was—an obviously hopeless comparison to attempt, for the facts are not adequately known or recorded. If a set of very rich people who have not got enough to do, spend their lives in various frivolities, this description undeniably applies to a section, though a small one, in England—it is only to be expected that some fall into follies, and some get caught in the grip of passions with which they have been playing. But on the whole the tone is good, the decencies are observed, and the unfaithful wife or the complaisant husband are not admired. It is considered more intelligent to get on together as man and wife, and if a harmony is sometimes preserved only by an organized tolerance or blindness, it is at least a tribute to the prevailing fashion.

Insensibly an article about Society in London becomes an article about women,—and with reason—for women make it, guide it, sustain it. It is they who organize many of the pleasures for the other sex, it is they who arrange parties for the most brilliant of their acquaintance, male or female, it is they who select and discard the members of their circle. A dull man is often accepted by hostesses for the sake of his clever wife—but a clever man is rarely able to successfully float a dull or tactless woman. He must either go out without her, or drop from the ranks, for a dull woman is far more difficult to swamp or absorb owing to the social custom of deference to women, than is a dull man. Natural selection is as ruthless here as in other matters. There is a greater number of pretty and intelligent, leisured and therefore charming women in London than there is of clever, interesting men. It is one of the disabilities of Empire, that the outlying possessions claim year by year many of the more adventurous, thoughtful, and ambitious of England's youth. If a man is not the eldest son of a great house, and has no desire to go to the Bar, or enter politics, he is almost certain to get to India—or to one of the great colonies. After governing kingdoms, after fighting savage tribes or building railways which change the destinies of continents, these men come back to London as strangers—they are often run after, flattered, and feasted, but they do not stay—they return to their distant and strenuous lives and leave society very much as they found it. They rarely have the opportunity of marrying

into it, which may or may not be a loss for them, but is undeniably one for the girl who would have found in her husband's career a fitting outlet for her own energy, enthusiasm and ambition. The growing interest in the problems of empire which make women admire men of this calibre, the greater freedom of intercourse allowed, and above all the habit of constant and extended travel, will alter these conditions, and there may in time be far more intermarriage between England and her colonies than now exists between England and America. American women have started the fashion of travelling—and incidentally that of marrying out of their own land. Their English sisters being able to satisfy hankering after titles and other social amenities at home, will probably extend their choice almost entirely to men of their own race.

No description of social life would be complete without some mention of its duties and claims. The feudal dependence upon great families, the claims of poor relations, the patronage of struggling authors and artists, these things exist no longer as institutions to which all must submit, whether they wish to or not. Instead has come a far wider sense of responsibility, including these claims, and many others as well. Hardly a social man or woman exists who does not give time and work to his or her particular charity or league. Many great reforms have been initiated in this way—the attempt to redress coming from the very class carelessly dubbed as heartless. The efforts are sometimes futile and unfruitful, but a surprising amount of devotion and ability exists, and in times of national crisis, like the Boer War, social men and women come to the front, and reveal powers of organization and work little suspected. Many women spend all their leisure in promoting various causes—many men rob themselves of well-earned rest to help in definite philanthropic work.

In attempting to give any picture of Society as a whole it must always be borne in mind that there are circles within circles in London: there are houses where you can get brilliant talk, political and social; there are houses where people who belong to various choirs and choral societies meet to sing through old madrigals and part-songs; there are hostesses who provide perfect concerts, who give balls, who arrange card parties, and there are others who attract round them the literary flavor of the moment.

Large, flashing, many-sided, English Society of to-day deserves much adverse criticism, but it is also worthy of study and of admiration. From its ranks are drawn many of the nation's most famous men and women—and to its ranks are welcomed every day all and any who have distinguished themselves. The bright gaudy pattern is woven on a plain and sober ground of solid work and achievement. Society in England is adapting, expanding, altering with the general state, and is therefore not a mere excrescence on the national life, but an integral part of its organism.

EDITH LYTTETON.

33. Great Britain — Sport. Sport occupies at the present time, as indeed in all periods of English history, a space in social organization which those who would understand national life

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and character cannot possibly ignore. Speaking generally, in most of the forms which it has assumed, sport represents the survival of those instincts and aptitudes developed by primitive man to cope with the two imperious necessities of his existence; defence against his fellows and the quest for animal food; and war and the chase, which were the expression of these necessities, demanded qualities of very similar character. Both necessities exist at the present time, but war is of far less frequent occurrence and the pursuit of wild animals is rare in old and civilized countries. But in the less advanced provinces of the Empire adventurous Britons find the older conditions still prevalent, and there, as in times of war nearer home, large opportunity and recognition is accorded to those qualities which are characteristic of the best sportsmen—courage, cheerfulness, discipline, the faculty of command, the corporate sense, the spirit which, forgetful of self, rejoices in the power and cohesion of the crew, the regiment and the team. A school of reformers whose eyes are bent at the present time on national efficiency in war are disposed to deny the value of sporting qualities in modern warfare, and preach with conviction the necessity of the training of our youth in drill, rifle-shooting and other exercises more closely related to military science. It is doubtful whether these views are harmonious to the national tastes, and whether if they prevailed, the training suggested would ultimately produce better material than the less organized physical discipline of field sports and games. Be that as it may, sports and games have a great, perhaps too great, a vogue in England. Not unfrequently they have become an end in themselves, and as perhaps is natural in a period of ever increasing wealth and leisure, men pass from cricket, tennis and polo in the summer to hunting, shooting and golf in the winter, believing that they are attaining, as doubtless they are pursuing, pleasure; but they carry on their countenances the negation of their expectancy and furnish living proofs of the existence of the law of contrast prescribing that pleasure must take its roots in foundations of strenuous and often irksome industry. Recreation, which sport in its true sense represents, is that which refts and recuperates man and renders him more capable to do his work, and the nation which has seized this conception of sport, lives up to it and narrowly observes its tests, has little to fear from the joyless exaggerations of pleasure, or the nervous morbidities of industrial excess. But when the basis of industry is firmly established, those gain most from recreative sport, and get most efficiency from its pursuit, who are the most absorbed and strenuous, put forth for the time being every faculty and energy into the affair of pleasure, and whose ardor for success is limited only by the canons of the highest chivalry, and by the resolve that while every nerve must be strained to defeat him, an antagonist, whether man or beast, must have all the courtesy and honor of war.

The seriousness of Britons at play is often the wonder of amused and tolerant foreigners, but much can be urged to justify it; if realities have for a time to be banished, the phantoms pursued in their place must have their semblance and fashion; the problems of politics, law and business, the cares of every day life absorb and

wear the brain; to exclude them there is need of substitutes which will really engross other faculties than those normally in use.

Few will dispute that the Britons have carried sport further and cultivated the sporting spirit more assiduously than any other civilized race. This energy is in part accounted for not by the greater prevalence in ancient days of war and the chase in England, but by the peculiar social conditions absent elsewhere, but which obtained in earlier days in England. Looking backwards only so far as the days of the Stuarts, before Puritanism had set its ban on many of the pastimes of our forefathers, we find that while in France the Court encouraged the noble to assert his plea in society by living in Paris or Versailles, the Stuarts regarded the status of country gentlemen as a profession in itself. The squire was expected to keep open house, administer local justice, relieve want and furnish employment. These functions, enforced by a shrewd purpose from above, confirmed a not unwilling class in those duties which were not so onerous as to prove any serious bar to much sporting. The deer in the enclosed parks were deliberately chased to the cry of hounds "slow in pursuit but matched in mouth like bells" hunting 'at force' ranged over wider spaces—the otter was speared, the badger trapped, the hare coursed and the fox hunted by the squire who owned his own hounds. But if these sports were the peculiar domain of the well-to-do, the less wealthy enjoyed with a whole heart fishing, then open to nearly all, and games of all sorts. The country lay ever at the townsman's doors, and wrestling, where life and limb were in jeopardy, jumping, pitching the bar, dancing and nine pins were native customs, while football enjoyed a popularity which emulates that of the present time. The husbandman, when the fat swine were killed on the approach of winter, got the bladder and blew it out great and thin, and "tried it out at football with the shins." The simplest of all games, it was played with local rules suited to the nature of the ground, often across the stream and up the length of the village. King James forbade it at Court as "meet-er for the laming than the making able of his liege subjects," but all classes commonly joined in the scrimmage to the good old cry of "all fellows at football." The causes, partly economic and partly political, which attached the rural gentry to the land received renewed impetus from the Napoleonic wars and the great appreciation of prices of agricultural produce of that period; and the honorable opinion that obligations should accompany social privileges in rural life, is happily to this day widely felt throughout the land. Local government and administration and minor judicial work still remain, and the police, notwithstanding the activity of County Councils, are largely controlled by the experience of country gentlemen, and so long as there is this solid background of usefulness for them, field sports will continue to be enjoyed by the gentry, but for whose presence in rural England they would soon perish. But it is natural and inevitable that with the growth of population, and above all of the perpetually increasing facilities of locomotion which make that population so mobile, hunting, fowling, stalking, and shooting, owing to the competition for them, tend

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to be the sports of a relatively diminishing portion of the population. Fox hunting does indeed (wild stag hunting is now so rare as to be almost a curiosity) despite the inroads of civilized life still retain a leading position in England sports, but railways and motors are making and will make its pursuit more and more difficult by temporarily concentrating into particular places most adapted for the sport such large numbers of people living at a distance that the agriculturists, who formerly never repelled and often welcomed the advent of hounds, now require large compensation for the kindly hospitality which they extend to their passage over the land. This is not surprising when a field of 500 horsemen, many of them strangers to the district, accompany the hunt whose progress ravages both crops and fences in spite of a dictator's authority freely accorded to the master and exercised to the general good. The attachment of Britons to the greatest of all sports is attested by the expenditure, cheerfully borne by men often not rich, which of necessity follows on the track of such damage, but it is to be feared that in the coming years other obstacles to hunting more difficult to overcome will follow in the wake of more specialized and scientific agriculture.

Shooting is enjoyed under more advantageous conditions as the great natural wheat lands and pastures of the world come more completely into use. Deer forests and moorlands are less likely to be required in the future than now for the purposes of pastoral or agricultural industry. The driving of both grouse and partridge has, contrary to expectations, resulted in a wonderful improvement in the health and reproductive power of these birds. The Battue of pheasants, though probably requiring greater skill from the individual in the technique of actual "gunnery," is by reason of its artificiality lacking in the highest interest and excitement of sport, but for that very reason it can be conducted in places where nature has been most obviously civilized. Partridges, though wilder than pheasants, if let alone will seldom go beyond the limits of two or three fields, they need not the silence and the calm of the moors, and are not averse to the frequent presence of man; thus partridge shooting is a popular sport and on the first of September, the echoes are answering a dropping fire from John O'Groats to Lands End.

Driving, usually postponed till three or four weeks later, requires large estates and much organization, drilling of beaters, etc., but there remain many lively days of more desultory sport widely enjoyed by modest folk, sometimes advancing in line over the fields, sometimes using the dogs who were formerly indispensable. Geese, snipe, duck and woodcock are rare in any considerable numbers, but the rabbit's white tail vanishing into the burrow is one of the most familiar spectacles of the rougher and less highly cultivated countries. Fishing is even more democratic and is pursued by great varieties of men of all conditions and all ages, but salmon and good trout fishing are already beyond the reach of modest incomes, even in Scotland. This sport, which in the opinion of many great judges, is second to none, is connected with many disappointments and has infinite varieties.

The element of uncertainty and risk enter into it to a degree sufficient to answer the expectancy of the most exacting, but like hunting it is greatly to be feared that the enjoyment of its exquisite pleasures must be more and more restricted, and the pursuit more and more detached from universal national life. In truth those causes against which no expert can be of any avail and to which reference has already been made, the fast filling up of the island, the limited area unoccupied by the presence of man, machinery and locomotive facilities of all kinds are slowly tending to draw the vast majority of the people from the chase to those games whose enjoyment is independent of the existence of wild nature, and whose arena is accessible to all. Cricket, football, racing and golf occupy a truly astonishing position in the public mind. Even in Scotland, where cricket is, comparatively speaking, little in vogue, the leading newspapers devote daily, five or six columns to accounts of these pastimes, while it is noticeable that English journals whose leading articles contain austere exhortations against gambling, and denunciation of the undue dominance of sport, are forced by the struggle for existence to chronicle at wearisome length the very subjects whose popularity they deplore. Racing has become so commercial and statistical that it may be said to have, for many of those who are prominently engaged in it, many of the characteristics of business, and it affords great pleasure and excitement to innumerable speculators who without seeing the races, or knowing anything of horses, hazard sums of money varying in amount under the guidance of "tipsters" in newspapers on the issues of remote contests. In the north of England and sporadically in the Midlands and South there exist many genuine lovers of horses deeply interested in the science of breeding for speed, and enjoying without pecuniary stimulant the glorious sensation of pride and admiration which the victory of a horse bred at home and reared with affectionate and anxious solicitude inspires.

Gambling has not entered to so considerable an extent into cricket or golf, though it is said to be making its way into the wide regions where football holds sway. But the commercial spirit is tending to invade the arena of popular games. Cheap excursion trains concentrate vast crowds of spectators in the large cities; so many as 100,000 gather to see the most important football engagements; and during the three days occupied by a cricket match 50,000 or 60,000 frequently pay sixpence or a shilling for a pleasure which to men engaged in hard manual toil throughout five days of the week has the deepest attraction. The press is compelled to give large spaces to description of contests which arouse such widespread interest and stimulate such extensive circulation among a public who but for the sporting cohesion would never dream of purchasing the cheapest journal. The opportunity of a good livelihood pleasantly earned is, as a result, extending itself to a larger and larger number of professional players, and if the worthiness of an occupation is to be measured by the different pleasures which it conveys, a professional cricketer or footballer is earning his bread in at least as meritorious a manner as many other crafts-

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men against whose calling no criticism has ever been made. But irritation is aroused at the disproportionate celebrity which is attached to skill in these pursuits, and to the ambitions which they excite among amateurs, and to the place given in national life to things which should be the variants and not the principal motives of energy. A powerful temptation is continually presenting itself to young men just at the time when the real business of life should begin to earn popular applause and distinction by making a game the staple occupation of their time. The result often is that at the age of 35, when physical powers for these purposes begin to lose their first bloom, men who have had much excitement and have awakened much popular notice fall into an enforced and unwilling idleness which is often difficult, after so long a delay, to disperse by the practice of a profession or entrance into business. Criticism is heard far and wide of this exaggeration of a natural and manly taste, but no remedy will ever be of the slightest avail unless it be accompanied by an alteration in public opinion and estimate of the value of proficiency in games.

At present no evidence of such a change is perceptible in the Anglo Saxon race. In America, though less widely diffused, games are prosecuted with an intensity characteristic of an energetic people. Australia, New Zealand and South Africa are more deeply inoculated with their attraction than the mother country. In one province leading statesmen vie with civic dignitaries in applauding and welcoming with honors the dashing batsman or the "demon" bowler; in another the expenses of the all-conquering football team are placed on the estimates and cheerfully voted by an enthusiastic Parliament. Few anticipate a diminution, many expect an increase in the popularity of sport, and the historian of the future will probably be able to institute an interesting comparison between those nations who are trained more consciously for war and those who are learning some of its lessons in sport. The phrase "play the game" has passed into the language as a symbol of honor, unselfishness and veracity; we may hope that the sources of these virtues will be untainted by commercial standards and will refresh and preserve national manliness.

ALFRED LYTTELTON,

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34. Great Britain — The Fine Arts. The earliest records of British art are concerned with the decoration of palaces, churches, costumes, arms, furniture, and domestic utensils. But we find the point of transition from the useful to the fine arts in the shrines, such as those erected by Edward I. to the memory of Queen Eleanor, the monuments, tombs, painted tablets and portraits on glass and in illuminated MSS. of the 15th century. From the 15th century onwards oil painting became the chief medium in which the memory of important persons and events was recorded. All the important work of this kind was, however, till the 18th century, in the hands of foreign artists, who were attracted to England by the munificence of the kings and nobles; hence, with the possible exception of Holbein's and the best

of Van Dyck's portraits, it reflects the national instincts and sentiments only from an external and superficial point of view. But the distinctively British school of painting, which sprang into existence during the 18th century, owed much to the influence of these foreign artists and their works, and to the numerous collections of pictures by celebrated continental artists which collectors like the Earl of Arundel and Charles I. had formed. These provided a kind of university in which native-born artists could educate their taste and master the manual secrets of their art. The English artists had only to assimilate the traditions of the great foreign schools and to use the technical skill thus acquired for the expression of those more intimate nuances of the national character which foreign artists—whatever their artistic gifts—were incapable of sharing. Hence, the astonishing rapidity with which the English school of painting developed, the absence of technical experiments which marked its first stages, and the very high standard of executive ability which the earlier men possessed.

PORTRAIT PAINTING.

The first English portrait painters seem to have seen their sitters through the eyes of the foreign masters under whom they had studied or on whose works they had formed themselves. The very skilful miniatures of Nicholas Hilliard (1537-1619) and Isaac Oliver (1564-1617) show the influence of Holbein and the French miniaturists. Robert Streater (1624-1680) was a pupil and imitator of Dumoulin, William Dobson (1610-1646) and John Haylis, (— 1679) of Van Dyck, John Greenhill of Salisbury, (1649-1676) of Sir Peter Lely. Samuel Cooper (1609-1672), whose fine portrait of Cromwell is well known, and John Riley (1646-1691) were the first to express a more distinctively national point of view in their portraits. Jonathan Richardson (1665-1745), Riley's pupil, had great influence in directing attention to the intellectual and imaginative aims of paintings.

William Hogarth (1697-1764) is the first great English artist. In a series of paintings like 'The Harlot's Progress,' 'The Rake's Progress,' and 'The Marriage à la Mode' (National Gallery), he brought the whole drama of contemporary life into pictorial art. Such pictures contain abundant evidence of the artist's powers of observation and memory, but Hogarth was not content to observe life merely from the outside. He does not choose a series of situations and proceed to visualize them as they would appear to an indifferent spectator, but, as Charles Lamb has pointed out, he seizes his subjects with such an extraordinary power of imaginative intuition that they seem to direct him, and his paintings, instead of confining themselves to external matters, become a revelation of and a commentary on the unseen qualities—the moral and intellectual attributes—of his characters. To do this the whole of the artist's personality has to be engaged in his work of dramatization, and it is inevitable that the result should bear the impress of his temperament and convictions. Hogarth has been censured, especially by continental theoreticians, for allowing his moral emotions to appear in

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his work; but the place his art has taken in the life of the English people depends almost entirely upon the warmth and thoroughness with which he made himself an exponent of their instincts, sentiments, and aspirations. There can be no doubt that Hogarth is as thoroughly national in what have been called his moralistic prejudices as in the completeness and sharpness of his observation, his rollicking humor, and the animation, vigor, and bitterness of his satire. With such gifts it is not surprising that Hogarth has left us some excellent portraits. His own portrait, in the National Gallery, and that of Captain Coram, in the Foundling Hospital, are generally considered his most successful efforts in this branch of art.

Thomas Hudson (1701-1779), a pupil of Richardson, was a successful rival of Hogarth as a portrait painter. His merits have, however, been obscured by the achievements of his pupil, Sir Joshua Reynolds (1723-1792). Certainly no painter has ever entered so subtly as Reynolds into all varieties of the English heart and mind. His portraits have such a striking air of individuality that they carry instant conviction of their veracity. This commanding quality is largely due to the completeness with which he identified himself with the aspirations and instincts of his countrymen, as this determined the principles of selection and rejection in his observation. We have Northcote's authority for saying that lovers "used to tell him (Reynolds) that after seeing his portraits of their ladies, they thought the originals handsomer than before; the reason of this was," he adds, "Sir Joshua seized upon some particular quality that he liked and made it more palpable than it was in nature, and which afterward served as an index to point it out to them." But while differentiating the essentially poetic or imaginative intuitions of the artist from the exhaustive and impartial observation of the man of science, we must be careful to point out that Reynolds's felicity of perception is just as clearly distinguished from the arbitrary constructions of fancy. They are real men, women, and children that he gives us, not mere figments of his imagination.

With such gifts, sedulously cultivated by unremitting practice and an exhaustive study of the works of the Italian and Dutch painters, Reynolds has taken his place amongst the greatest artists of modern times. Among the finest of his portraits of children we may mention 'The Age of Innocence,' 'Heads of Angels,' 'The Infant Samuel,' and 'Robinetta' (all in the National Gallery), and 'The Strawberry Girl' of the Wallace Collection. The 'Portrait of Nelly O'Brien' (Wallace) and 'Mrs. Siddons as the Tragic Muse' (Duke of Westminster) are among the best of his portraits of women. The superb 'Portrait of Lord Heathfield' (National Gallery), together with those of Dr. Johnson, Goldsmith, Burke, and himself are all fine examples of his grasp of men's character.

Thomas Gainsborough (1727-1788), the great rival and contemporary of Reynolds, was less varied in his portraits than that master. He approached his sitters with a stronger subjective bias and he was not so profound an observer. The charm of pathetic tenderness

and melancholy which he gives to all his sitters belongs rather to the painter's own character than to theirs. His instinct for physical grace and beauty was probably keener than Reynolds's, but there were certain aspects of life in which he was little interested. Hence, his portraits convey a less concrete idea of his sitters than those of Reynolds. But this tendency toward abstraction enables him to express the qualities he is interested in with great clearness and emphasis, so that his pictures often give more intense and immediate pleasure than those of Reynolds. Among his most remarkable portraits are the 'Mrs. Siddons' (National Gallery), 'Mrs. Sheridan and Mrs. Tickell' (Dulwich Gallery), the 'Blue Boy' (Duke of Westminster), and the 'Hon. Mrs. Graham' (Edinburgh). Gainsborough's landscapes are at least as fine as his portraits, but we will defer speaking of them till we come to deal with landscape painting.

The tendency toward one-sided and arbitrary abstraction which we notice in Gainsborough is still more pronounced in the works of his contemporaries and immediate successors. George Romney (1734-1802) was so much impressed with the examples of Græco-Roman sculpture he saw in Rome that he took them as models for his own work. He betrays a constant striving to make the women and children who sat to him look like animated statues. This predominant concern with the external side of art led to the neglect of the intellectual and emotional sides of life. The idea of the sitter conveyed in Romney's portraits is therefore less capable of taking its place in any fully articulated conception of reality than is the case with Reynolds. But within his own limits Romney's works have a vivid consistency which gives them high rank as works of art. The very popular 'Parson's Daughter' (National Gallery) is freer than usual from the painter's besetting tendency to impose a pre-conceived ideal on his sitters; his own portrait (National Portrait Gallery), though unfinished, is a most interesting and characteristic work. Sir Henry Raeburn (1756-1823), a brilliant and successful artist, who worked principally in Edinburgh, painted nearly all the celebrated Scotch men and women of his time, with the exception of Burns. John Hoppner (1759-1810) was chiefly concerned to make the faces of his portraits pretty, and only as a secondary consideration to make them like his sitters. Sir Thomas Lawrence (1769-1830), with whom the great school of British portraiture may be said to have come to an end, used his great mechanical cleverness in the service of the false elegance and false sentiment fashionable in his day at the court and among the associates of the Prince Regent. There is less metricious affectation in his male portraits.

The school of humorous genre, founded by Hogarth, was developed in the direction of caricature by the water colors and engravings of Thomas Rowlandson (1756-1827), Gillray (1757-1815), the two Cruikshanks, Isaac (1756-1811) and George (1792-1878), John Leech (1817-1864), etc.; in the direction of prettiness and domestic sentiment by painters like Wilkie (1785-1841), Mulready (1786-1863), Webster, Newton, William Collins, Frith, etc.

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LANDSCAPE PAINTING.

It is, however, in the domain of landscape painting that English artists have won their chief triumphs. If the English school of portraiture was the only great school of painting in Europe in the 18th century, the English school of landscape painting, which culminated in the works of Turner and Constable, may be said to have enriched poetic art with a new form of expression and to have revolutionized every form of modern art.

Richard Wilson (1713-1782) is generally regarded as the first of the great English landscape painters. His fame still suffers from the large number of canvases by pupils and imitators which are passed off under his name in most of the public and private collections. When at his best his feeling for breadth and quality, for tone and light and color, has been rarely equaled. He was one of the first painters of delicate morning effects of misty blue and silver. His designs have a freshness and beauty, and a majesty or serenity of atmospheric effect which even Corot and Turner have equaled but rarely. No other artist influenced Turner so much. In Gainsborough's (1727-1788) landscapes we find the same tendency toward abstraction which we noticed in his portraits, but here his sense of physical beauty and the peculiar charm and tenderness of his temperament find freer play. Of his four important landscapes in the National Gallery, 'The Watering Place' is the most celebrated. In such pictures Gainsborough struck an intimate personal note which was new in landscape-art, but which had much in common with the note of lyrical Nature-worship, which was beginning to make itself heard in such poems as Thomson's 'Seasons.' No less essentially poetic is the art of John Cozens (1752-1799), the first great English water color painter. He is a poet of a more austere stamp than Gainsborough. His drawings are generally low in tone and subdued in color. He preferred Nature's "most silent eloquence."

J. M. W. Turner (1775-1851) began his career as a topographical draughtsman and water color painter. But soon after he was 20, under the influence of Wilson's and Cozens's work, he repudiated topographical art altogether in favor of a more poetical treatment of landscape. It became a principle with him that mere imitative landscape, painted as it might be photographed nowadays from a fixed point of view and embracing all that could be seen from that point of view, and no more, did not even represent the place so fully as a more general treatment would do. He therefore made a point of bringing any buildings and objects into his pictures, which from their importance or singularity, were especial features of the place, even though they were hidden from his point of view or out of the field of his picture. Thus, Redgrave tells us, "he would say that no one should paint London without Saint Paul's, or Oxford without the dome of the Bodleian"; and constantly in his pictures he would move a building of importance considerably to the right or left, to bring it into what he considered its best place in the picture. "And this," Redgrave adds, "is quite consistent with reason, for no one but an art-

ist views a town or any scene from a rigidly fixed point of view." We may add that this is merely the application to landscape painting of the principles upon which Reynolds invariably worked, and which he has formulated in his 'Discourses.' In the fourth Discourse he states that "even in portraits * * * the likeness consists more in taking the general air than in observing the exact similitude of every feature." This is because art addresses itself to the imagination; and this end is best secured when the artist makes all the details of his picture subordinate to his own imaginative intuition of his subject.

In the whole of his long career, during which his style underwent a series of startling transformations, Turner remained inflexibly faithful to Reynolds's conception of poetic art. His work is always an attempt to express a poetic conception or intuition, never an articulated collection of dispassionate observations. The differences in his style are the result of the changes which took place in his attitude toward life. Between 1800 to 1820 he gives us works which suggest comparisons between the dominant moods of Milton's and Wordsworth's poetry, after 1820 his works become possessed of a Byronic recklessness and sensuousness, with vague aspirations toward the unlimited. As typical examples of the earlier period we may mention 'The Frosty Morning,' 'Abingdon,' and 'Windsor' (National Gallery). These incomparable works show us that Turner could, as Prof. Raleigh has said of Wordsworth, "feel deeply and sanely and wisely in the presence of things seen." Though dealing with ordinary aspects of English life they have an unforced beauty of design and color which has few equals in the artist's work, and a tenderness and sincerity of feeling which makes the beautiful Gainsborough, which hangs opposite to two of them, seem almost rhetorical. In the later period the artist's chief aim seems to have been to astonish and dazzle the public. The restraint of the earlier works is abandoned for a loose suggestiveness, sincerity to a strange mixture of gorgeous rhetoric and childish naivety.

The most characteristic works of John Constable (1776-1837) form a striking contrast to Turner's later pictures. Constable's subjects are conspicuous for their simplicity; they generally consist of a farm, a few picturesque cottages, a village church or green, or peaceful rivers wandering through luxuriant meadows. He treats such subjects with rare intimacy and sincerity. His pictures are characteristic of lowland England, and of "English homes" with "dewy pastures, dewy trees." Though Constable had not Turner's range or exquisite sensibility of temperament, he infused such a wealth of genuine affection into pictures like 'The Corn Field,' 'The Hay-Wain,' and 'The Valley Farm' (all in National Gallery), that they have long taken their place among the masterpieces of the English school. With Constable and Turner must be classed Crome (1769-1821), Cotman (1782-1842), Cox (1783-1859) and De Wint (1784-1849).

With these landscape painters what may be called the classical period of English art came to an end. In portraiture, landscape and genre-

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painting it had succeeded in expressing the best qualities of the English race; its high seriousness and imaginative force, its healthfulness and strong simplicity. But while universal in its substance it had remained individual in its form. The artists, while animating their work with their own personal convictions and emotions were yet so happily characterized as to stand as types of their fellow-countrymen. Their individual modes of impression and conception were those of all their countrymen, only freed more completely from the bias of exclusively selfish interests. There was no specially artistic point of view. The chief characteristic of most subsequent art—of Academic, Pre-Raphaelite, Realistic and Impressionistic art—is that it is the expression of a specially and artificially developed manner of perception. Modern English art is therefore less national than the art of Reynolds, Gainsborough, Turner and Constable; it makes a narrower appeal, is more of an exotic, a thing of coterie and faddists, requiring a specially developed system of apperception for its enjoyment.

ACADEMIC ART.

The distinguishing characteristic of Academic painters like Benjamin West (1738-1820), Barry (1741-1806), Herbert, Horsley, Long, Ward, Armitage, etc., is the substitution of intelligent plagiarism for spontaneity and creative force. Technical accomplishment takes the place of personal emotion. Such artists' works are generally arrangements after celebrated models; simplicity, directness of feeling, and all peculiar national stamp give way to an empty rhetorical manner and a blind worship of routine and processes.

THE PRE-RAPHAELITE SCHOOL.

The Pre-Raphaelite movement, which began about in 1848, was a well-meant and in some respects successful protest against Academic plagiarism. A band of young artists, of whom Holman Hunt and Millais were among the most prominent, resolved to do their uttermost to root out of their practice the influence of their teachers and of all the approved examples of their art, and to base their work on a fresh and personal study of Nature. The change thus inaugurated was primarily a technical one. The subject-matter of their pictures differed little from that of their older and Academic rivals. The difference was to be found in their methods of exact and elaborate representation. When the arrangement of the picture was settled every object to be represented was studied separately and painted direct from Nature. As Mr. Hunt has told us, "direct application to Nature" was made "for each feature, however humble a part of foreground or background this might be. I justified the doing of this thoroughly as the only sure means of eradicating the stereotyped tricks of decadent schools." Typical pictures of this kind are Hunt's 'Light of the World,' 'Jesus in the Midst of the Doctors,' and Millais's 'Ophelia.' Pre-Raphaelite theories also exercised a powerful influence on the black and white work produced between 1850 and 1870, notably in the wood-engravings designed by Rossetti, Sandys, Millais, Houghton and Pinwell.

REALISTIC SCHOOL.

It is not at first sight easy to distinguish the Realistic school of painters from the Pre-Raphaelites, of which they are strictly speaking an off-shoot. With Hunt and Millais the principle of direct and elaborate representation was always intended to be kept in subordination to the interests of imaginative art ("it cannot be too clearly reasserted that Pre-Raphaelitism in its priority was the frank worship of Nature, kept in check by selection and directed by the spirit of imaginative purpose.") (H. Hunt, 'Pre-Raphaelitism' II. p. 452). In the works of realists like Thomas Seddon (1821-1857) and John Brett (1832-1902) this "frank worship of Nature" became an end in itself. The chief aim of Seddon's 'Jerusalem and the Valley of Jehoshaphat' (National Gallery), and of all Brett's pictures, is to give trustworthy information about the scenes represented.

IMPRESSIONISTIC PAINTERS.

This attempt to abstract physical reality from its setting in human consciousness was carried still farther by the Impressionists. The naive vision of the Pre-Raphaelites had drawn attention to the importance of local colors in nature, the later works of Turner had directed attention to the transformations which atmospheric conditions exercise upon these colors. Impressionism makes the study of the atmosphere the main object of each picture. The Pre-Raphaelites had eliminated black and brown from their palettes; the Impressionists, partly owing to their example, partly out of deference to some questionable optical theories, have deliberately confined themselves to the use of the seven colors of the spectrum. The chief Impressionistic painters have been Frenchmen, but they have exercised considerable influence on recent English art. Among the more prominent Impressionistic painters in England are Mr. P. Wilson Steer and Mr. Wynford Dewhurst.

It has already been remarked that all these artistic sects are concerned mainly with technical questions, so that though each had had and still has its coterie of enthusiasts and initiated, none has enjoyed the whole-hearted support of the mass of the educated public. Each sect has no doubt voiced certain aspirations common to a large number of their fellow-countrymen, but as a whole their works reflect the national mind and temper in a fitful, fragmentary, and more or less arbitrary fashion. There are, however, three artists belonging to the latter half of the 19th century, who stand outside this war of artistic sectaries.

G. F. Watts (1817-1904), an artist of lofty ambitions, deliberately appointed himself the exponent in imaginative art-forms of all that seemed to him noblest and most worthy of admiration in his age. What he might have done had his great gifts of grandiose and monumental design had free play can be seen from his magnificent fresco in the hall of Lincoln's Inn, and from such paintings as 'Love and Death,' 'Hope,' 'Eve,' etc. As a portrait painter he belongs to the great school of Reynolds; portraits like those of 'Lord Shrewsbury' and 'Joachim' show the same greatness of conception and the same supreme gifts of

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imaginative intuition. His statues, like 'Clytie' and 'Vital Energy', have given him a great reputation as a sculptor.

D. G. Rossetti (1828-1882), though associated with the Pre-Raphaelites in the earlier stages of their movement, was essentially an emotional or romantic painter. Among his more important works are 'Beata Beatrix' (National Gallery), 'Dante's Dream' (Liverpool Corporation Gallery) and 'The Bride' or 'The Beloved.'

F. Madox Brown (1821-1893) was also at one time a member of the Pre-Raphaelite group. In his designs for the decoration of the Manchester Town Hall, and in such pictures as 'Work' (Manchester Corporation Gallery) and 'The Last of England' (Birmingham Corporation Gallery) he proves himself an artist of sincere and unbending talent, passionate in conception, impressive and convincing in execution.

With our limited space we cannot speak in detail of the beautiful and expressive work of the English Water Color painters, like Sandby, Hearne, Rooker, Cozens, Turner, Girtin, Cotman, Cox and De Wint.

SCULPTURE.

Sculpture has never flourished in England owing, it has been said, to adverse climatic conditions. The only really great sculptor England has produced is Alfred Stevens (1817-1875). Among other distinguished sculptors the names of Flaxman, Armstead, Thornycroft, Brock and Gilbert may be mentioned.

ARCHITECTURE.

It has often been questioned whether Architecture should be ranked among the fine arts, which are concerned primarily with the expression of intellectual and imaginative ideas, not with the production of objects of utility. The present tendency among architects to reduce architecture to a matter of good, sound, and convenient building emphasizes this objection. But there can be no question of the supreme artistic beauty of the Gothic cathedrals of England. As examples of the early English style (1180-1307) Salisbury Cathedral and the Nave of Lincoln may be cited; the choir of Lincoln is a typical example of the decorated style. The reigns of Henry VIII. and Edward VI. (1536-1540) saw the erection of a large number of grammar schools and colleges; that of Elizabeth the inauguration of the era of the erection of the great domestic mansions. In these buildings the late Gothic style was modified and gradually developed under the influence of the old classical architecture into the Anglo-Classic of Inigo Jones (1572-1652). In the buildings of Wren (1632-1723), such as Saint Paul's Cathedral and the Sheldonian Theatre, Oxford, French influence is more apparent. The 19th century saw a battle for pre-eminence between the Classic and Gothic styles. The restoration of a large number of cathedrals and churches and the erection of an immense number of new churches greatly aided the Gothic revival, but for public buildings the classical style, modified by modern French and Italian ideas of the Renaissance, has generally been adopted. In the latter part of the century the works of Norman Shaw, Nesfield, and Philip Webb initiated a movement

in favor of the Queen Anne style, or Free Classic as it is sometimes called. As examples of this style we may mention Mr. Shaw's 'New Zealand Chambers' in Leadenhall street, and a number of country houses. Mr. Shaw's influence on the design of the smaller buildings in the suburbs and country by the erection of houses, etc., at Bedford Park, Chiswick, has been considerable.

ART INSTITUTIONS.

The establishment of the Royal Academy of Arts and state and municipal schools of design and art galleries, has undoubtedly exercised considerable influence on the later developments of British arts; whether this influence has been on the whole beneficial has sometimes been questioned.

The Royal Academy of Arts in London, as it was at first called, was established in 1768. It was an offshoot of an older professional society known as the Incorporated Society of Artists in Great Britain, which had come into existence as the result of the first public exhibition held in London (in 1760) of works by contemporary artists. The constitution of this society was of too democratic a character to suit some of the members. They therefore set about the establishment of a new society of a less representative character, and, as they were fortunate enough to secure the patronage and financial assistance of George III. and were thus enabled to obtain the co-operation of Sir Joshua Reynolds, their exhibitions gradually ousted those of the older society in the favor of the public. The Royal Academy has since maintained itself as the most wealthy and powerful art society of Great Britain; its influence among the better educated of the public has, however, been steadily diminishing of late, and it cannot be said at the present time to be really representative of the body of art workers in this country.

It consists of 40 academicians, mostly painters, with a few sculptors and architects. There is a second order of probationers, called associates, whose numbers vary from time to time, from whom alone the vacancies that occur among the academicians can be supplied. It supports and manages schools for the training of painters, sculptors and architects, the instruction in which is gratuitous. The cost of these schools during the last 30 or 40 years has averaged from £5,000 to £6,000 a year. The total number of students admitted between 1769 and 1900 was 4,697, giving an average of about 36 a year. The distribution of charitable funds is confined to its own members or to exhibitors at its annual summer exhibitions. The average annual amount distributed among its members "has been latterly," to quote a semi-official statement made in 1900, "about £2,000"; the donations to distressed artists who have been exhibitors at the Academy, their wives, and children under the age of 21, has averaged from £1,200 to £1,500. The whole of the funds at the disposal of the Academy are derived from the profits on the annual exhibitions, to which about 1,200 non-members contribute works and about 65 members and associates. The fact that the Academy is thus forced to put the making of a large profit out of their exhibition in

the forefront of their activity may possibly account for the disfavor into which they have fallen with a number of the more serious of the younger artists.

The neglect of the art of engraving and of what are often called "the minor arts" of design by the Academy induced the government to open a school of design at Somerset House, London, in 1837, and in 1840 grants were made to establish similar schools in five of the more important provincial towns. In 1852 a Department of Practical Art was instituted, and the formation of a museum was begun which developed into the present Victoria and Albert Museum at South Kensington. About 1880 a growing conviction of the inadequacy of the governmental schools led to the establishment of new technical schools in the principal towns. The municipality of Birmingham established a singularly well-equipped and organized school, as did also the municipalities of Manchester, Glasgow and Leicester.

The British National Gallery, though the collection is small and modern, is among the most representative of European state galleries. It was founded in 1824, by the acquisition of the Angerstein collection. Its accessions are governed by a parliamentary grant of £5,000 to £10,000 a year, but it benefits by a large number of gifts and legacies, the most important of which have been the Vernon gift in 1847, the Turner bequest in 1856, and the Wynn-Ellis legacy in 1876. The galleries contain few poor works and all schools are well represented, with the single exception of the French school.

The National Gallery of British Art (known as the Tate Gallery) is devoted to modern British pictures. The Victoria and Albert Museum has also a number of British pictures, especially in water color. The National Portrait Gallery was founded in 1856, the National Gallery of Scotland in 1850, and the National Gallery of Ireland in 1854. There are also important municipal galleries at Birmingham, Glasgow, Liverpool, etc., and few large towns are without a permanent gallery of some description.

Bibliography.—A history of British Art showing the place it has occupied in the life of the people is a work which has not yet been undertaken, at least with any considerable degree of success; the details of the private lives of the artists have generally attracted more attention than the effects of their works. The only moderately successful attempt to present a reasoned account of the vital influence exerted by the national art is to be found in Richard Muther's 'Geschichte der Malerei im XIX. Jahrhundert' (3 Bde., München, 1893-4), of which an English translation has been published (London 1895-6); the parts dealing with British art have also been brought together and slightly amplified and published separately under the title 'Geschichte der Englischen Malerei' (Berlin 1903). Much valuable information is to be found in Ernest Chesneau's 'The English School of Painting' (Eng. Tr. 1885), R. and S. Redgrave's 'A Century of Painters of the English School' (London 1866), and D. S. McColl's 'Nineteenth Century Art' (Glasgow 1902).

A large number of volumes dealing separately with the works of all the more promi-

nent artists, or with particular schools or periods have, however, been published. The most penetrating criticisms of Reynolds's work are to be found in Northcote's 'Memoirs of Sir Joshua Reynolds' (London 1813-15); 'Conversations of James Northcote' by William Hazlitt (London 1830), and 'Conversations of James Northcote, R. A., with James Ward,' ed. by Ernest Fletcher (London 1901); for details of the artist's life, the 'Life and Times of Sir Joshua Reynolds,' by C. R. Leslie and Tom Taylor (London 1865), should be consulted.

The standard work for the earlier periods of British Art is Horace Walpole's 'Anecdotes of Painting in England' (1st ed., 1762-71, 5 vols.) For the lives and works of the principal artists the following volumes will be found useful: 'William Hogarth' by H. Austin Dobson (London 1902); 'Gainsborough and His Place in English Art' by Sir Walter Armstrong (London 1898); 'Romney' by Humphrey Ward and W. Roberts (London 1904); 'Sir Henry Raeburn' by Sir W. Armstrong, with Introduction by R. A. M. Stevenson (London 1901); 'Sir Thomas Lawrence' by Lord Ronald Gower, with Catalogue of the artist's works, compiled by A. Graves (London 1900); 'The Life of J. M. W. Turner, R. A.' by W. G. Thornbury (London 1862), and 'Turner' by W. Cosmo Monkhouse (London 1879); 'Constable and His Influence on Landscape Painting,' by Prof. C. J. Holmes (London 1902), and 'Memoirs of the Life of John Constable,' ed. by C. R. Leslie (London 1843); 'Dante Gabriel Rossetti as Designer and Writer,' by W. M. Rossetti (London 1899), and 'Rossetti Papers, 1862 to 1870,' compiled by W. M. Rossetti (London 1903); 'Mémorial of Madox Brown' by F. M. Hueffer (London 1896); 'Pre-Raphaelitism and the Pre-Raphaelite Brotherhood,' by W. Holman Hunt (London 1905); etc.

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A. J. FINBERG,

Author of 'English Water Color Painters.'

35. Great Britain — English Newspapers.

The English newspaper has scarcely so long a pedigree as some others in Europe. Several German towns had their news-sheets or newsletters in the 15th century, and the Venetian Republic started its official gazette in the middle of the 16th century. There are legends of an 'English Mercurie' published in 1588 under Queen Elizabeth's patronage, but the 'Weekly News' and the 'London Weekly Courant,' both produced in 1622, and after these the numerous 'Mercuries' published by various parties during the civil war are the real beginnings. The censorship of the Restoration killed independent journalism for the next 30 years, and left the field clear to the official 'London Gazette.' A crop of new journals arose on the abolition of the Press Licensing Law in 1695, and in 1702 the first daily newspaper, the 'Daily Courant,' a small sheet printed on one side, made its appearance. But, though the censorship was withdrawn, governments retained the weapon of taxation, and for the next 130 years the history of English journalism is that of a perpetual struggle against heavy and arbitrary imposts. At the beginning of the 18th century, many news-sheets were sold for a halfpenny; in the year of Waterloo (1815) and for nearly 20 years afterward the taxation was four pence a copy, and the usual price to the public six pence or seven pence. Newspapers in those days had a great many readers per copy. News agents let them out for a penny an hour, and sold them in the provinces at a reduced price, when a few days old. In 1836 the stamp-duty was reduced to one penny the sheet, and in 1855 it was abolished, together with the advertisement tax, which was scarcely less oppressive. The paper duty was also diminished during these years, and its final repeal was achieved by Mr. Gladstone in 1861 after a memorable struggle with the House of Lords. It was this complete relief from taxation which in Mr. Gladstone's words "called into vivid, energetic, permanent, and successful action the cheap press of this country."

Certain of the great English newspapers, notably the 'Times' (1778) and the 'Morning Post' (1772) have been continuously in existence since the last years of the 18th century, and their proprietors, especially Mr. John Walter of the 'Times,' rank high among the pioneers of modern journalism. The 'Times' was first printed by steam as early as 1814, and greatly improved its position by its enterprise in this respect. Happily the abolition of the "taxes on knowledge" came in the nick of time to enable the English press to take full advantage of the development of railways and telegraphs. In later days the organization of the press has followed much the same lines in England as in America, a leading feature in both countries being the establishment of agencies for the joint collection of general news. The leading English newspapers have, however, shown great enterprise in foreign, special, and war correspondence. No English journalists have made a more conspicuous mark or are better remembered than the chief correspondents in these various departments, such as Sir William Russell and M. de Blowitz of the 'Times'; Mr. Archibald Forbes, Mr. Laurence Oliphant, and Mrs. Craw-

ford of the 'Daily News.' The English newspapers, like the American, have been able to spend lavishly on their news and correspondence by reason of the large revenues which they have drawn from advertisements. Herein they have the advantage of French, Italian, and even German newspapers, which have not succeeded in developing that side of their business to anything like the same extent. For this reason British and American newspapers greatly resemble each other and differ from all others in their large sheets, numerous pages, and heavy proportion of telegraphed matter.

English newspapers are accustomed to describe themselves as "organs of opinion" and have always taken pride in their power of influencing opinion through their leading articles. Men of great ability and literary accomplishment were employed on this part of their work during the last half of the 19th century, and the chief morning papers regularly presented their readers with three or four leading articles, each a column long and in the conventional form of three paragraphs to each article. The centre page containing these articles was perhaps the most characteristic feature of Victorian journalism. The principle of anonymity was jealously guarded during this period. No one knew the names of the leader-writers, and it was contrary to the etiquette of the profession for any writer to claim the authorship of his article. The opinions expressed were accepted by the public as the opinions of the journal and not the opinions of any individual member of the staff. The aim of the writer under these conditions was to be grave and well-informed, rather than lively or brilliant. The exclusion of the personal element and the constant use of the editorial "we" compelled a rather ponderous pose, and the rigidity of the form and length for all subjects, whatever their importance, led to a certain diffuseness and monotony of treatment. In spite of these defects, the journalism of opinion was never more powerful than in this period and no newspapers ever had a steadier or more continuous influence on public affairs than the 'Times,' the 'Morning Chronicle,' the 'Standard,' and the 'Daily News' during the middle years of the last century. The leader-writing tradition is still powerful, but the old hard and fast conditions have been relaxed. In the last 30 years of the last century, two or three powerful individuals, notably Mr. Frederick Greenwood, first editor of the 'Pall Mall Gazette,' and subsequently editor of the 'Saint James's Gazette,' Mr. John Morley, who followed him as editor of the 'Pall Mall Gazette,' and Mr. Stead, who followed Mr. Morley on the same journal, obtained a personal influence which broke through the anonymous tradition. These writers still used the anonymous form, but there was a quality in their writing which revealed them and gave new life and color to the leading article. At the same time the 'Daily Telegraph' was breaking through the solemnity of morning journalism and bringing a great many subjects, previously thought too trivial for treatment by responsible newspapers, within its range. Mr. L. A. Sala invented a new kind of leading article to which nothing human was alien, while Mr. Andrew Lang (in the 'Daily News') wrote of books and litera-

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ture with a delicacy and skill which quickly took the public fancy. In the early 80's Mr. Stead came on the scene as editor of the 'Pall Mall Gazette' and introduced many new features, including "the interview," which were regarded at the time as daring innovations from American journalism but most of which have since been adopted by the older established newspapers.

In the 10 years from 1890 to 1900 the changes in the English press were many and rapid. The cheapening of paper, the introduction of typesetting machines, and the improvements in printing machinery—many of them introduced by American firms—led to the starting of many new journals and the enlargement of most existing journals. The 'Daily Mail,' established in 1896, set a new fashion in halfpenny morning journalism which was quickly followed in London and the provinces. Two of the old-established morning papers, the 'Daily News' and the 'Daily Chronicle' subsequently reduced their price from a penny to a halfpenny, and there are now no less than six halfpenny morning journals published in London. In the provinces the penny morning papers still hold the chief position and are conducted with great skill and enterprise, but the halfpenny evening paper has an immense vogue with all classes.

The new conditions have to some extent changed the character of the English press. Sport, fashion, and business as well as amusements and entertainments of all kinds compete powerfully with politics for the attention of the reader. The old verbatim reports of Parliament and public speeches give way to short summaries and descriptive sketches. The Parliamentary sketch-writer is a regular and most important member of the staff. Editors of the old school, like Barnes and Delane of the 'Times,' who directed their journals primarily with a view to influencing public affairs, have grown scarcer in these days, and their successors are more often than not described as "editor-managers." They are expected to cultivate a great variety of interests and to be constantly in touch with the business departments of their journals. The question whether the influence of the press is not seriously diminishing has been much debated in England during recent years, but it is scarcely possible to answer it in general terms. The word "press" covers a great many types of journals and periodicals. There are newspapers conducted with the greatest skill and enterprise which aim rather at reflecting than at influencing opinion and which have great power in emphasizing the prevailing sentiment in times of excitement. But there are still a great many others which directly influence statesmanship and administrative policy by serious, independent, and expert criticism on public affairs. In its literary style the English press stands midway between the American and the French press. The English journalist stops short of the vigorous popular manner of the American, and he scarcely achieves the deftness and subtlety of the French. But on the whole the standard of writing has improved in spite of the introduction of popular features. The newspapers tend to widen the circle of their contributors and to rely less exclusively on their own staffs. There is scarcely

any eminent man or woman of letters who is not an occasional writer for the press, and signed articles by experts fill a large space in the daily newspapers. There follows a certain competition of interests which somewhat detracts from the old editorial unity of the English journal, but a greater variety of clever writing is now possible than in the old days when an anonymous staff did all the work.

At the present time (1906) 18 morning and six evening papers are published daily in London, the former including three financial and two sporting journals. In addition to these 76 morning and 138 evening papers are published in the provinces of the United Kingdom. The daily newspapers do not appear on Sundays, their place being taken by special Sunday journals.

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J. A. SPENDER,

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36. Great Britain—The Trend of Thought and Literature in the 19th Century. *General Characteristics.*—An almost unprecedented development or expansion of intellectual energy characterized the opening years of the 19th century in Great Britain. The emancipating influences, which had produced the French revolution, were then working in England at their acme of strength, and were generating an intellectual as well as a political and social reformation, which steadily gathered force as the century grew older. The new tide of thought found at the outset its loftiest manifestation in purely imaginative literature. The mighty revival of imaginative literature, amid which the century opened, is only comparable with that of the age of Shakespeare. The highest intellectual energy of the nation seemed to find, at the beginning of the epoch, its complete and most congenial expression in the departments of poetry and fiction. Between the years 1800 and 1825 the works of Wordsworth, Shelley, Byron, Coleridge, Keats, Jane Austen and Sir Walter Scott were the chief triumphs of the intellectual movement which was clarifying man's mental vision and remodelling his aspirations.

After the first quarter of the century the creative literary activity of England showed some signs of exhaustion. But the ebbing was then of short duration. The tide of intellectual energy in the sphere of literary endeavor quickly rose again. The torch that had been lighted by

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Wordsworth and Shelley, Byron and Scott, Lamb and Coleridge, soon flamed anew in the hands of Tennyson and Browning, of Dickens and Thackeray, of Macaulay and Carlyle, of Ruskin and Matthew Arnold.

With the sixth decade of the century, a radical change came over the intellectual horizon of the nation. The intellectual spirit no longer contributed the whole of its richest sustenance to the field of great imaginative writing. It long continued to nourish splendid imaginative effort; only when the century closed did the purely imaginative energy, which had flowed on almost continuously from the first, grow sluggish and tame. But midway through the century the intellectual spirit proved fertile enough to produce in new glory and luxuriance a second and a very different type of intellectual fruit. During the last five decades, the intellectual spirit gave a fresh and unexampled impetus to scientific inquiry and to speculation concerning the character and capacity of all animate and inanimate nature. For a generation the poets and novelists, the critics and historians, divided the honors of intellectual exertion with scientific investigators like Darwin, Wallace, Huxley and Tyndall, and with philosophers like John Stuart Mill, Herbert Spencer, Thomas Hill Green, and Leslie Stephen.

When the century was reaching its end, the spirit of scientific inquiry was producing no triumphs so heroic as those associated in the middle years with the names of Darwin and his disciples. But scientific energy was at the close of the epoch still giving notable proofs of activity, while literary energy was comparatively torpid. In the last half of the period science and pure literature may fairly be credited with having slowly changed their relative places in the empire of the British intellect. Pure literature which held the place of predominance at the beginning of the era yielded it to science before the end. The mass of available intellectual energy which had gone at the outset to the making of poetry and fiction, of history and criticism, was ultimately diverted to the cause of science. In general terms, the gradual and peaceable succession of science to the throne which had been occupied by imaginative literature may be said to mark the trend of British thought and literature in the 19th century.

Homogeneity of the Imaginative Effort.—For the purpose of detailed study of the literature of the century it might be convenient to divide it into four chronological sections—each corresponding with one quarter of the period. But there is an essential homogeneity about the whole of the century's literary effort, which renders chronological division undesirable in a brief survey. Specious grounds may be urged for separating the century, in however rapid a general view of its thought and literature, into at least two periods, the one ending and the other beginning at the accession of Queen Victoria in 1837. In 1837 the literary giants of the opening years of the century either were dead or had ceased to write. Among poets, Byron (1788-1824), Shelley (1792-1822), and Keats (1795-1821) had passed away. Wordsworth (1770-1850) had ceased to be a poetic force, save in the sight of admirers more zealous than discreet. Of writers of fiction, Jane Austen had

been dead 20 years and Sir Walter Scott five. Among essayists whose work conferred on the literature of the century one of its most distinctive charms, Charles Lamb, the genial king among such literary artificers, did not survive beyond 1834; Hazlitt died in 1830, and although De Quincey and Leigh Hunt lived more than 20 years longer, their best work was done in the pre-Victorian Epoch.

But there is no genuine philosophic ground for detaching the work of these heroes from that of their successors. The writers of eminence, who have exclusive right to the epithet Nineteenth Century or Victorian, prove after allowance has been made for individual idiosyncrasies which in great literature count for much, to belong in spirit to the age of their immediate predecessors. They sought expression for their thought in forms not essentially different from those to which their predecessors devoted their energies, and their thought showed no new departure. It still breathed that faith in the dignity of mankind, in its inalienable right of rational liberty and in the greatness of the human destiny which was the outcome of the French Revolutionary spirit, at the same time as it paid respectful homage to surviving tradition of the great art and literature of a more distant past.

Tennyson (1809-92) who shares with Robert Browning (1812-89) the first place in the poetry of Victorian England, is nearly at all points Wordsworth's successor. Like Wordsworth he was in sympathy, through his prime, with the political and philosophic enlightenment of his era. It was this which he sought to interpret in his verse. He was a careful observer and a sympathetic expositor of inanimate nature. He had Wordsworth's command of poetic diction and melody, and also, it is to be admitted, Wordsworth's tendency to bathos and commonplace, in spite of his keen ear and sense of form. Browning—the twin-peak with Tennyson in the range of Victorian poetry—presents a stronger individuality. He is less closely allied to the writers who flourished in his early youth. But in many of his most striking characteristics,—in the subtlety of his power of psychological analysis, in his robust optimism, in the universality and activity of his interest in current life and literature, in his predilection for study of past history and biography, and even in his indifference to the graces of form which degenerated with him at times into a barbarous grotesqueness—in one or other of these regards Browning betrayed kinship with Coleridge, Byron, Landor and Scott.

Third in the list of those Victorian writers of the imagination, whose lives wholly belonged to the 19th century, stands Matthew Arnold (1822-88). As a poet Arnold marched under the banners of Wordsworth and Shelley; as a critic in prose he was at some points more subtle and less sympathetic, and at other points clearer-eyed and less prejudiced than Lamb or Hazlitt. But the distinctions between Arnold and the earlier essayists of the century are due not so much to difference of epoch or of innate temperament. They are attributable rather to the idiosyncrasies that come of accidental divergences in youthful training and environment. Arnold's native heritage of genius bore an academic impress owing to his association with

Rugby, a great public school of which his father was a distinguished headmaster, and with Oxford, the University whose traditions and temper he permanently assimilated as a young man. Had Lamb and Hazlitt enjoyed Arnold's youthful experiences, their style and sentiment are likely to have worn Arnold's colors. They were at one with each other in their ultimate conception that the æsthetic sense was the sense best worth developing in human life and thought.

The three poets whose genius first blossomed midway through Queen Victoria's reign, Dante Gabriel Rossetti (1828-1882), William Morris (1834-1896) and Algernon Charles Swinburne (b. 1837), all to some extent inherited and developed the tradition of Keats. Rossetti and Morris were painters as well as poets. The former was a leader of the pre-Raphaelite movement, which sought to reproduce in art the simple beauty which distinguished pictorial effort of the early middle ages. As poets, Rossetti and his friend Morris sought their affinity in the sphere of mediæval romance, whence both Keats and Sir Walter Scott had drawn with differing motives much inspiration. Rossetti was almost as great a master of the sonnet as his teachers Wordsworth and Keats, and he and Mr. Swinburne improved on Keats's and Tennyson's aptitude to suggest in metre new and subtle harmonies of music. Swinburne, at the opening of his career, seemed to graft on the sensuous influences of Keats the voluptuous temper of Byron. He cherished the wild aspirations which were bred of the French Revolution. The poetry of Mr. Swinburne's youth ranks among the century's literary glories. He alone of his poetic school still survives. But his late work has hardly sustained the promise of his rebellious early years. The unimaginative spirit of the second half of the century would seem to have discouraged and repressed his poetic development.

The seventh great master of Victorian literature, whose work in spite of the varied aim may best be classed with literary products of the imagination, was John Ruskin (1819-1900), who in that field survived all masters of his generation, save Mr. Swinburne. Ruskin has, like Rossetti and his friends, some claim to be numbered with the disciples of Keats. He devoted himself to expounding an æsthetic philosophy, the germ of which is discernible in Keats's poetry. He gave a very wide interpretation to the attributes of beauty, which he identified with excellence in every kind of human endeavor. In his voluminous writings he sought to define the place that beauty and its manifestation in art ought to fill in human economy. His clarity of style, imaginative insight, and assertive personality invested all his literary work with fascination. But he owes his chief importance in the history of 19th century thought and literature to his masterly interpretation, analysis and application of the æsthetic principles which underlie the most characteristic achievements of the great writers belonging to the generation that preceded or was coincident with the date of his own birth.

Fiction and Drama.—In fiction it might appear as if the spirit which colored manifestations in the early years of the century perished before the later or even the middle years were

reached. The centre of gravity may seem at any rate to have shifted somewhat violently between the dates of 'Sense and Sensibility,' 'Waverley' and 'Vivian Grey' on the one hand, and of 'David Copperfield,' 'Adam Bede' or 'Vanity Fair' on the other. Still wider may seem the interval between 'Romola,' 'Esmond,' and 'Barnaby Rudge,' and 'Harry Richmond,' 'Jude the Obscure,' and 'Dr. Jekyll and Mr. Hyde.' But all the masterly fiction of the century aims, through different avenues, at a like goal. It seeks the exact, the vivid, the sympathetic and for the most part the optimistic representation in narrative of the complexities and perplexities of human life and feeling. Whether the novelist rear his structure on historical research or on autobiographical experience, on careful observation of contemporary society, or on imaginative speculation into human potentialities, his success is due to his power of combining in his chronicle artistic presentment of facts of experience with sane and practical interpretation of thought and impulse.

None of the great novelists of the 19th century failed at one or other period of their careers to emulate Sir Walter Scott's method of seeking in history material through which to work out their ambitions. Scott concentrated on the historical novel a mass of learning and a wealth of intuition which no successor inherited. But the spirit which animated his achievements in the art of fiction lived, albeit in attenuated condition, in the labors of Charles Dickens (1812-70) and William Makepeace Thackeray (1811-63), of George Eliot (1819-80) and Robert Louis Stevenson (1850-94). Thackeray reached the highest point of his career as an artist in fiction when he produced 'Esmond,' a story of the time of Queen Anne. Dickens in 'The Tale of Two Cities' and in 'Barnaby Rudge' brought all the vigor of his genius to vivify historic episodes of the century preceding his own. George Eliot proved herself more scholarly and more laborious, and therefore less successful than Dickens or Thackeray, when she sought in *Romola* to evolve a romance out of the history of the Florentine reformation. Robert Louis Stevenson, master of the most picturesque style among novelists since Laurence Sterne, made his most sustained bid for reputation by pursuing in the chronicles of Scotland the historical trail. The same category embraces the most notable work of lesser luminaries like Bulwer-Lytton, Charles Kingsley and Charles Reade, with each of whose names an historical novel of eminence has to be associated.

Not that the novel of current experience failed to flourish in increasing luxuriance as the years of the century grew. The cultivation of fiction, which reflected the foibles and aspirations of contemporary society, absorbed throughout the epoch literary genius of the most varied and conflicting types. The most conspicuous laborers in this field of endeavor were, during the early years, Jane Austen and Disraeli, while their successors included Charlotte Brontë, Dickens, Thackeray, Trollope and Charles Reade during the middle years of the century and George Meredith and Thomas Hardy during the last years. The century's yield of fiction in all its forms far exceeded in quality and quantity that of any earlier epoch. The stream was con-

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tinuously replenished and it maintained till near the end a level approximating to that of the first days. But even in fiction the creative energy failed in intensity as the epoch closed.

The drama was the only field of imaginative literature in which England of the 19th century failed to secure conspicuous and lasting triumphs. The standard of excellence which Shakespeare set in the 16th and early 17th centuries was not likely to be reached again. But the dramatic productions of the 19th century proved of smaller value than the efforts of the 17th or 18th century, which, despite their inferiority to Shakespearean drama, maintained a level of permanent interest. No writer of comedy in the 19th century is comparable with Sheridan, not any writer of tragedies with Dryden or Otway. Writers like Browning and Mr. Swinburne, who devoted poetic genius to tragic or romantic drama, never acquired mastery of the true dramatic temper which belongs to the art of the theatre. They proved themselves capable of fine poetic declamation and were skilled in the use of poetic language, but their efforts resulted in the production of dramatic literature for the study rather than of drama for the stage. Bulwer-Lytton, Sheridan Knowles, Tom Taylor and T. W. Robertson are the only English playwrights of the early or central years of the 19th century any portion of whose work lived after its original production in the theatre. Taylor and Knowles essayed romantic drama. Lytton and the rest won their chief fame in the comedy of manners. But immortality was denied them. None of these men courted with any effect the muse of tragedy. Such plays of theirs in the vein of comedy or romance as retained their vogue in a succeeding generation quickly lost the savor of freshness and seemed to breathe in a very short space of time an antiquated or a faded atmosphere. Their fame soon flickered. A chief cause of the failure of drama to attract during the 19th century any substantial or efficient part of the literary genius of the era doubtless lay in the competing claims of the novel. The growing complexity of life and thought rendered it increasingly difficult to give, in the brief and graphic terms of drama, permanently satisfying expression to the complexity of current aspiration and speculation. The art of fiction is freer of conventional restrictions than dramatic art, and gives fuller scope to endeavor, which seeks to interpret variegated experience and manifold human effort.

Carlyle and Macaulay.—The 18th century not only won its literary triumphs by virtue of the exercise of the imagination in poetry and romance. Throughout the century history and criticism, in which the imagination plays a more limited part, were flourishing conspicuously. Henry Hallam (1777-1859) produced between 1818 and 1837 three solid historical works, which anticipated many of the characteristics of the new historical school in England. They were for the most part genuine studies of original authorities and although they betrayed a whig political bias were conscientious endeavors to present the facts fairly. A robust common sense atoned for the lack of sympathetic imagination or broad philosophical temper. But Hallam's labors stand apart and lay for the most part outside the main contemporary currents of

intellectual effort. The two representative practitioners of the arts of history and criticism in the 19th century—Carlyle and Macaulay—were possessed of far greater literary genius than Hallam and exerted a wider influence. Both were long lived. Their work was well begun before Queen Victoria commenced to reign; it continued long after. Carlyle was born five years before the end of the 18th century and died in 1881. Macaulay was born in the first year of the last century and died in 1859.

Carlyle is one of the most distinctive figures in the whole range of literary activity in the 19th century with which his life was almost co-terminous. He was thoroughly imbued with the large ideas of man's social perfectibility to which the leaders of the French Revolution gave expression in their cry for liberty and fraternity. But he was at the same time a potent and censorious foe of many of the social tendencies which the French Revolution set in motion. He warned his contemporaries of the dangers inseparable from the levelling spirit of a democratic age, with a greater practical effect than any man of letters has compassed before by dint of mere passive penmanship. To Carlyle's essays and lectures may in part be attributed that definite recognition of the limitations inherent in a purely democratic ideal, to which, in the earlier decades of the century, the eyes of the mass of Englishmen seemed closed.

Carlyle's finest literary work was done in the fields of history. He toiled complainingly in the dry-as-dust repositories of historical learning, but he did not take so wide a view of the historian's fiction as the greatest of the British historians, Gibbon, nor were his researches so exhaustive or so multifarious as the more recent scientific standard of historical investigation prescribes. But by force of a rare imaginative insight into human action and character, Carlyle recalled to life a series of episodes of the past, with a truth and realism which no poet or novelist, working with unlimited right and power of invention, has excelled in pith and moment. Carlyle's 'French Revolution' (1837) and portions of his 'Frederick the Great' (1858-65) set before the reader historic episodes with something of the dramatic intensity of the historical plays of Shakespeare.

At the same time as Carlyle was working out his destiny, Macaulay was also making masterly contributions, of not altogether dissimilar calibre, to the literature of the century. Macaulay's knowledge of books and records was as great as Carlyle's, if not greater, but his historical achievement remains on a lower plane. He possessed far less imaginative intuition. His mental horizon was limited by temporary conditions of current political conflict. His conception of historic fact was colored by partisan prepossessions, which, viewed in relation to the great destinies of the human race, seem puny, and in a historian, tend to unveracity. Carlyle and even Gibbon had strong prejudices, but their native sentiment was cast in a larger mould. Their preconceptions left the historical spirit in the main unclouded.

In style Carlyle and Macaulay were as the poles asunder. The spasmodic irregularity of the one has nothing in common with the disciplined orderliness of the other. Macaulay's

influence on the English prose style of the century has been far greater and on the whole more beneficial than Carlyle's. Carlyle's style was a bow of Ulysses, which none but himself could bend. In other hands it became an implement of burlesque. Macaulay's style which was less impracticable, inherited and developed many of the best features of the prose of the 18th century. It was mainly characterized by a directness and an emphasis which often grew into brilliant and stirring eloquence, although it inclined at times to monotonous rigidity, and at times to declamatory violence. It proved a dangerous style for purposes of servile imitation. The habit of insistent emphasis is apt to degenerate among the incompetent into bombast. At the same time the discreet and intelligent assimilation of Macaulay's prose tends to clearness and point without appreciable sacrifice of grace. Toward the end of the century a passing reaction set in against the metallic clearness of Macaulay's diction, and efforts were made to invest English prose with a subtle elegance and cloudy preciousness to which it was not naturally adapted. The most remarkable of such filigree workers in prose was Walter Pater (1839-94). Another conscious artist in prose was Robert Louis Stevenson but he was endowed with a fertile imaginative power which preserved his style from the vices of pedantry and kept its lucidity intact. Pater devoted himself to æsthetic criticism which he clothed in a delicate and ornate verbal garb. Pater often achieved beautiful effects. But the methods were inseparable from affectations and conceits, which often render his prose difficult to read with understanding. The irresistible vogue of Macaulay's prose style ordained that none should be widely acceptable which failed at any point in perspicuity. John Ruskin, whose æsthetic criticism covered a wider field than Pater's, proved, too, that perspicuity in English prose was not incompatible with artistic beauty and pliancy. Affected prose consequently met with small encouragement; it was cherished by coteries and did not color the broad currents of the century's literature.

The Scientific Tendency.—The trend of English literature and thought was profoundly affected by the scientific and philosophic spirit of inquiry which received a triumphant impulse from the publication of Charles Darwin's 'Origin of Species by Means of Natural Selection' in 1859, and from the inception of Herbert Spencer's 'System of Synthetic Philosophy,' in 1862. The earlier literary work of the utilitarians, Jeremy Bentham (1748-1832), David Ricardo (1772-1823), James Mill (1773-1836), and above all, John Stuart Mill (1806-73), only indirectly touched the imaginative temper of the times. The topics which the utilitarians handled were practical matters of social and political reform, some of which had been suggested by the French Revolutionary movement. The larger conceptions of man's physical or spiritual destiny were for the most part overlooked. The statute book of the realm between 1840 and 1874 reflected the economic principles which the Mills and their disciples disseminated, but neither the great poetry nor indeed the great fiction, bore, in any appreciable degree, trace of the reforming activities or enthusiasm of the

utilitarians. Dickens occasionally expanded in his novels the practical suggestions of the utilitarians, but it was elsewhere, it was in the literary presentation of universal features of human nature, that he rendered his most memorable service to literature. The scientific and philosophic movement gathered its greatest force in the years which followed the revelations of Darwin and Spencer. Then at length the scientific spirit spread to the nation's literature and affected the matter as well as the manner. On prose style it exerted an immediate influence. It insisted with a greater force than Macaulay's example commanded on perspicuity as the main virtue of expression, and effectually discountenanced whatever was subtle, obscure or deliberately affected. One scientific writer, Thomas Henry Huxley, who championed and developed the Darwinian doctrine, lived on till 1895. Huxley was gifted with an exceptional clarity of thought and expression, and his range of interest in current affairs secured for his writings a wide general audience. Huxley's labors may be regarded as an efficient agent in the national development of plain-speaking prose.

As far as the new scientific spirit affected pure literature, it may be said to have exerted a hampering effect on imaginative effort. Both George Eliot and Tennyson in their later work showed proclivities to philosophic or scientific speculation, which encumbered their imaginative deliverances with scientific terminology. Till the end of the epoch scientific or philosophic speculation inclined to divide the allegiance of men who were endowed with poetic genius and to dissipate their energies. William Morris, whose poetic gifts enabled him to conquer rich fields of pure romance, devoted most of the energy of his late life to developing theories of social regeneration which had their root in current scientific and philosophic inquiry.

Not that the scientific tendencies of the century went forward without check. Religion at times called literature to her aid in order to rally her forces for conflict with science. A specially vigorous attempt was made in religious circles by the Oxford movement, of which John Henry Newman (1801-90) was the chief literary leader, to stem at the outset the tide of the scientific advance. Newman was a great man of letters whose imaginative powers were combined with great delicacy of style in both poetry and prose. He made contributions of lasting value to the literature of the century. But his reactionary efforts failed to restrain the scientific and philosophic impulse of his era, if they did not by their open defiance of scientific progress consolidate the champions of free scientific speculation, and accelerate their victorious march. An endeavor to effect, on more pacific lines, a compromise between the opposing forces of science and of the imaginative sentiment of religion was made by leaders of another school of thought which was known as the Broad Church. That school of thought had no greater sympathy with Newman's unbending conservatism than with the revolutionary independence of scientific and philosophic inquiry. The Broad Church leaders, Frederick D. Maurice and Charles Kingsley, were ready and voluminous writers. But their theological or philosophic position was logically unsound, and they failed

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permanently to affect the trend of contemporary thought, which finally accepted the scientific away beyond risk of relapse.

It was in the field of history, of all departments of literature, that the scientific spirit most resolutely planted its standard. Workers in history grew in number as the century closed. But only one English historian of the period deliberately persisted in the literary tradition, which Carlyle and Macaulay had dignified. James Anthony Froude, who died in 1894, alone practiced history as a branch of great literature. In his historical work he gave free play to a natural gift of style and a sense of the picturesque. He treated accuracy of detail or judicial impartiality as comparatively of small account. For the time being, Froude is the last representative of the great literary school of historians.

It was in the middle of the century that the scientific spirit invaded the province of history and developed a new view of its aims. Facts were to be accumulated and arranged so as to illustrate and explain the evolution of civilized progress. The scientific method of historical inquiry was first put in practice by Henry Thomas Buckle (1821-62), whose unfinished 'History of Civilization' excited great public interest. The first volume appeared in 1857, the second and last in 1861.

The substantive value of Buckle's labors proved less than he or his admirers anticipated. The field of observation, which he sought to survey, proved too wide for any one man's capacity. His method depended for its success on mastery of minute detail touching every department of human endeavor. The quest of omniscience proved fatal. Many of the generalizations, in which Buckle's scheme compelled him to take refuge, were either disputable or were confuted by more specialized research. But though Buckle's historical work failed long to sustain its authority, its influence was permanent. It encouraged the application of scientific method to historical investigation. It raised the standard of historical accuracy. It promoted specialized research. It encouraged concentration of industry in narrow fields of historical inquiry.

Six men, Seeley (1834-95), Lecky (1838-1903), Freeman (1823-92), Stubbs (1825-1901), Creighton (1843-1901), and Gardiner (1829-1902), were the most conspicuous representatives of the tendency to pursue in history the methods of scientific accuracy. The order in which the names are placed here indicates the progressive ascendancy of specialization in historical research. The six men's modes of work differed in detail among themselves. Seeley and Lecky sought to graft a broad philosophic tone on their historical investigations. Freeman, Stubbs, Creighton, and Gardiner rarely suffered their minds to stray from their endeavors to accumulate and to test the facts which illustrated the evolution of politics or political institutions. As a consequence the writings of Seeley and Lecky assimilated a finer literary spirit than those of their associates. While the permanent value of the scientific treatment of history is now admitted, there is risk of repelling students by too severe a presentation of the results of research, and it

may be that the new method stands in need of a greater infusion of literary art before its credentials will be accepted universally. Gardiner, the latest of the 19th century historians to pass away (d. 23 Feb. 1902), labored with rare self-denial within a narrow range of English political history, the early and middle years of the 17th century. He made small endeavor to cultivate the literary graces.

Another indication of the progress of scientific method in the province of literature is found in the energy which has of late years been applied to textual criticism of standard authors and to the publication of historic documents. The British government has undertaken the issue of state papers, of the maniments of great families and of official records. Private voluntary societies have cooperated in such endeavors, and with their aid local archaeology has especially been investigated with an unexampled thoroughness. Other private literary societies, like the Early English Text Society, and numerous private publishing firms, following the examples set by the presses of the great universities of Oxford and Cambridge, have placed at the disposal of the public, accurate texts of the great literary monuments of the country. In undertakings like the Dictionary of National Biography and the Oxford English Dictionary, efforts have been made to coordinate and codify on a large scale the hitherto scattered fruits of historical, literary and philological research. All these enterprises are tributes to the ascendancy of scientific method. They bear testimony to the trend of 19th century thought and literature, which shows during the last half, decay of the purely imaginative impulse, and advance of the purely scientific. But there is nothing in the nature of the present situation to preclude the revival in due time of such imaginative energy, as distinguished the first half of the century. Scientific and imaginative achievements are complementary fruits of the intellect. They need not be mutually exclusive. The future is likely to bring to light an accommodation of their respective pretensions to mastery in the realms of thought. There is small reason why science and pure literature should not flourish in perfect development side by side.

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EXTERNAL RELATIONS.

37. Great Britain—The British Navy. In one of his essays Emerson drew a vivid picture of the historic association of the English people with the sea, an association which falsified Virgil's famous line about the poor Britons being cut off from the world, by proving the sea to be the ring of marriage with all the nations. "England," he said, "resembles a ship in its shape, and, if it were one, its best admiral could not have worked it, or anchored it in a more judicious or effective position. . . . The shop-keeping nation, to use a shop word, has a *good stand*." Then, with true symbolism, he declared that the white path of an Atlantic liner was the avenue to the king of England's palace front. The king would consult his dignity if he gave audience to foreign ambassadors in the cabin of a man-of-war. That the British people have occasionally lost sight of this identity of their destiny with the sea is sufficiently shown by quite recent periods of their history and instances such as when in the reign of Charles II. the Dutch fleet sailed up the Thames. Byron's lines in *Don Juan* describe a similar state of affairs:

Nelson was once Britannia's god of war,
And still should be so but the tide is turned;
There's no more to be said of Trafalgar
'Tis with our hero quietly burned;
Besides the Prince is all for the land service
Forgetting Duncan, Nelson, Howe and Jervis.

There has, however, never been such distrust of the navy as exists in the case of the land forces, which is the origin of the fact that the Army Act has to be passed through Parliament each year in succession so that theoretically no standing Army can be said to be maintained.

Periods of maritime apathy on the part of the people have always synchronized with naval inefficiency afloat, a coincidence lending some countenance to a saying of the late Lord Salisbury which excited ridicule at the time, to the effect that the people and not the government are responsible for military efficiency. The education of the people is therefore a factor in the continued naval supremacy of Great Britain, for the reason of this occasional straying from the path of safety is probably to be sought in the fact that of all civilized nations the English are the least imbued with history. Again and again the sailor has been at issue with the statesman as when Torrington made his prophetic protest that the government would be afraid when the danger was past remedy. Hood was superseded for the vigor of his protests concerning the Mediterranean Fleet in 1793. Half a century later Rear-Admiral Berkeley threw up

his post at the Admiralty as a protest. In 1867 two Lords of the Admiralty resigned. Again, in 1888, a Lord of the Admiralty resigned; and in 1893 abdication on the part of the Board of Admiralty was threatened; all these cases being caused by penurious treatment of the Navy by the government of the day. Gladstone penned truer words than he knew in the *Edinburgh Review* in 1870 when he wrote of the vast advantages the English people derived "from consummate means of naval defense" and how when exceptional and peculiar advantages are the lot of a nation there is often a counterpoise in insensibility to their value. In this connection it is significant that historians, beginning with Raleigh and ending with Mahan, have been the best advisers. Raleigh it was who first preached what is now known as the blue water school doctrine in the following words: "He who rules the sea rules the commerce of the world, and to him that rules the commerce of the world belong all the treasure of the world, and indeed, the world itself." Take again his appeal to His Majesty "to employ his good ships on the sea, and not trust in any entrenchment on shore." Kinglake in a fine passage of his work on 'The Invasion of the Crimea' cites the unsuccessful bombardment of Sebastopol as an instance of how so unspeakably precious a heritage as the renown of the Royal Navy can be made "second to an ephemeral policy." As a historian he recognized the necessity for regarding the navy as too sacred to be experimented upon or sacrificed to mere expediency. The fact that the country since the battle of Worcester in 1651, has for so long been free from such internal dissensions as cause eyes to be turned inwards instead of outwards over the surrounding sea, or to a land frontier instead of the probable enemy's coast-line, has been an enormous advantage in enabling a fairly consistent naval policy to be pursued.

For some time the policy took the form of laying down two battleships for every one laid down by France. It was clearly shown by the Treasury Committee of 1859 that the result of their inquiries into the relative state of the navies of England and France was to show that England had nearly always been twice as strong in battleships and more than twice as strong in frigates. Subsequently, with the Naval Defence Act of 1889, there came into vogue the two-power standard of equality with the two leading European maritime powers combined with a margin of safety for contingencies such as the intervention of a neutral power. In 1899 the First Lord of the Admiralty

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after specifically stating that British naval expenditures simply rose and fell *pari passu* with the new ships laid down by the European powers, offered on behalf of Great Britain to reduce our programme if the other powers would do the same. Since the recent war there has arisen a school which claims, that as policy determines armaments, the Russian navy having for the time being vanished, and relations with France being friendly, the British Cabinet need only consider Germany. Against this it is urged with some force that as it takes two years to build a battleship and four to six years to build a number of them, it would be folly to neglect the possibility of Franco-German combination. History is replete with instances of the greatest enemies making common cause, as in the partition of Poland or the coercion of Japan by Germany, France and Russia in 1894. As regards the United States the best indication that British naval preparations are not made with any thought of war with that country is to be found in the fact that she does not maintain any squadron on either coast of North America, and has abandoned her naval dockyards in Canada.

Relative Strength.—The old doubling the chief-rival standard and the two-power standard, both appear simple enough, but the bitter controversies in the English press prove the problem of relative strength to be one of some complexity. This will be appreciated still more if ever the details of a disarmament scheme come to be examined. Thus the British official return of the fleets classes both the Dreadnought of 1906 and the Rodney of 1883 as first-class battleships. Count of heads unchecked by age is therefore clearly misleading. Tonnage comparisons are equally so from every point of view. The wood-sheathed bottoms of many British ships adding say, five hundred tons to the displacement, the extra quantity of coal carried for the purpose of keeping the seas do not add in the slightest degree to the fighting power on the day of battle. It is absurd on the face of it to allow as much fighting value to a ton of compound armor in the Royal Sovereign as a ton of the latest Krupp armor when the latter has over twice the stopping power. How misleading is a tonnage comparison can be seen by contrasting the Japanese Asama, which did so well in the war, with the British Kent of 100 tons more displacement. The Asama has two inches more armor, has the same battery of six-inch guns, two additional eight-inch guns, and has equal speed. The Rurik of 10,923 tons was easily defeated by two vessels whose aggregate tonnage was 7,350 tons.

The following is a complete statement as to the strength of three nations in vessels being maintained, and ships building and projected, adopting the classification of the British Admiralty's official return:

	Great Britain.	France.	Germany.
Battleships:			
First class.....	57	31	26
Second class....	0 } 57.	4 } 41.	9 } 39.
Third class	0	1	9
Large coast defence vessels...	0.	3.	0.
Armored cruisers.	38.	23.	9.
Other cruisers excluding unprotected cruisers.	71.	37.	34.

Taking the first-class battleships which will be built or building according to the programmes by Jan. 1908, we can divide them into five categories and include the United States for comparative purposes.

All first-class battleships built or building on first of Jan., 1908, less than

NATION OR COMBINATION.	23 years old.	18 years old.	13 years old.	8 yrs. old.	Laid down or projected 1905-7.
Britain	58.	52.	37.	19.	6.
France	23.	22.	17.	12.	6.
Germany	28.	27.	24.	16.	6.
United States(a)	28.	28.	24.	16.	48.
France and Germany ...	51.	49.	41.	28.	12.
Germany and United States(a)	56.	55.	48.	32.	10.
British force as a percentage of the 3 Powers	p. c. 73.4	p. c. 67.5	p. c. 56.9	p. c. 43.2	p. c. 37.5

(a) Does not include any programme for the United States in 1907. The Navy Department proposed in November, 1906, an immediate addition of two more battleships.

The cause of the steady decrease in the relative British strength as old ships are discarded lies in the great building efforts of the maritime powers since 1895, as disclosed by the following table dealing only with first-class battleships laid down in the years named:

	1885-9	1890-4	1895-9	1900-4	1905-7
Great Britain...	6.	15.	18a	13.	6.
France	1.	5.	5.	6.	6.
Germany	1.	3.	8.	10.	6.
United States..	0.	4.	8.	12.	4b

(a) Excludes Montagu.

(b) Does not include programme for 1907.

It should be noted that of the 58 British battleships enumerated in the above list, only the most modern 16 have complete armor protection for their water line, whereas all the French and German ships have complete belts. In a seaway the British ships would derive an advantage from their deeper belts amidships. Setting aside the cruisers which have their special functions in war, we may next compare the gun equipments.

It is obvious when a 12-inch gun of a few years ago is out-classed by a modern 9.2-inch gun of to-day, that the total guns according to size or calibre is no measure of strength. The theoretical perforation of the guns using capped projectiles against the latest Krupp armors at 5,000 yards is the best indication of their relative value. Excluding the armored cruisers which have their special functions to fulfill in war, the guns mounted in armored vessels by Great Britain, France and Germany may be classified as follows:

	Capable of piercing strongest armor	Belts of most battleships	A great number of defended positions	Armor belts of most cruisers
Theoretical penetration	17.5" to 18"	14' to 16"	11" to 13"	7" to 10.5"
Great Britain.....	48	84	68	92
France.....	40	16	110	64
Germany.....	64	..	40	40
France & Germany	104	16	150	104

It is quite clear from the comparison that Great Britain is completely out-classed by 1910

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in the best guns for long range. In the table it has been assumed that the press reports as to the armaments of the new German battleships being sixteen 11-inch guns is correct. In 1908 Great Britain will probably lay down at least two battleships or the equivalent of 20 guns, but Germany will also lay down two, with say, 32 guns, and it is an open question whether France will add to her programme.

In the case of cruisers Great Britain is building three 'armored cruisers' each carrying eight 12-inch guns, or guns capable of piercing the heaviest armor afloat; and Germany will lay down similar vessels at the rate of one a year. Setting aside these cruiser-battleships Great Britain has 35 armored cruisers carrying 56 guns capable of attacking any armor in any cruisers afloat, while France and Germany have 31 cruisers with 6 guns equal to those in the British cruisers and 52 but slightly inferior. The British Admiralty have expressed the opinion that the best of the 71 protected cruisers which are still retained must die out in the course of the next few years. It is difficult to see how the seas are to be effectively policed in face of determined attacks by unarmored vessels on the trade routes if reliance is only to be placed on 35 armored cruisers.

Natural Resources.—The introduction of steam and iron ships led to Great Britain becoming the great shipbuilding and shipowning nation and so strengthened her maritime position. Almost everything from the material for the hull to that for the motive power was formerly imported. Even the rapid introduction of oil fuel, for which Great Britain at present only possesses the Burmese supply, is no disadvantage to a power whose dual policy is to command the sea, so insuring safe communications to her oil-fuel steamers, and to keep on good terms with the United States which possesses the only other known oil-fuel supply outside Russia. In addition oil fuel, unlike coal, can be stored without deterioration. The natural tendency of the human mind is to be pessimistic in its outlook as to the effect of change of inventions in the future. It is not surprising, therefore, that in 1830 the Lords of the Admiralty should have issued a circular placing on record that they "felt it their bounden duty to discourage the introduction of steam, as calculated to strike a fatal blow to the naval supremacy of the empire," and in 1859 a Royal Commission should have prophesied that future wars would still be fought under masts and sails. The tendency of invention, as for instance in wireless telegraphy, is to increased reliability and certainty. Such a tendency must necessarily operate more powerfully in favor of the strong rather than the weak. The sea, it has been said, will only tolerate one mistress. While the weapons of war and their adjuncts were uncertain and fitful in their operation, it was, however, the case that a weak power resorting to the tactics of evading direct conflict could prolong an irritating struggle on the sea even as the Boers did on the land in South Africa. The old difficulties in obtaining and transmitting information have, however, practically vanished on the sea. The monopoly of both submarine cables and shipping practically lies in the hands

of Great Britain and with them she has a great addition to the power of her navy to control the sea in war.

The Distribution of Naval Force.—If invention has been of main assistance to Great Britain in the provision of naval force it has also aided her in its economical distribution. It was impossible for sailing-ships to move directly over only five-eighths of a circle at a speed varying with the direction and the force of the wind, and reduced to helplessness on a lee shore, it was impossible for such ships to control a great area of water with the facility of steamships aided by wireless and other forms of telegraphy. To take a simple instance, a sailing vessel endeavoring to make Gibraltar Harbor might be delayed off the Straits for as long as six weeks.

The complications formerly introduced into the distribution of naval force by the fact of small neutral powers possessing fleets, have vanished as the expense has become prohibitive. A Dreadnought costs eighteen times as much as a line of battleship such as Nelson's *Victory* a century ago, and eight times as much as the *Duke of Wellington* fifty years ago. The result has been to confine the business of naval war to seven great maritime powers and has led to the remarkable state of affairs at this moment by which the European powers limit their battleships solely to European waters. The difficulty of maintaining the British policy of sea supremacy in view of heavy expenditure and the relative increase of wealth and population in rival countries, must depend in the not distant future on how far the British colonies, on emerging as nations, are disposed to make common cause with the mother country in the maintenance of the navy.

The distribution of the British fleets, in spite of the relief obtained on the China station in consequence of the destruction of the Russian fleet, vividly illustrates the responsibilities falling to it from an Empire of 12,000,000 square miles with 43,000 miles of coast line. Only 1.1 per cent of the Empire is at the seat of government in Europe. Throughout 1906, the distribution of the Navy was as follows:

	At home in commission or in reserve.		Abroad, Cruising
Battleships	29.	16.	
Armored cruisers including Diadem and Powerful classes	20.	15.	
Large protected cruisers	10.	8.	10.
Small cruisers	18.	15.	
Destroyers	95.	47.	

The German fleet on the other hand, like the German Empire, is to all intents and purposes, concentrated. Having regard to the increasing demands made on the British Navy, the extraordinary stringency of which will become obvious in war when British fleets endeavor to keep the sea while important units incur the ordinary accidents of navigation or are away coaling and refitting, it is very much open to question whether adequate provision is being made for the future. A combination of France and Germany would place 516 torpedo craft and 91 submarines on the sea, or over double what is possessed by Great Britain, and some successes

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on the part of these craft as well as the dangerous floating mines must be provided for. Taken in conjunction with the dispersion of the British force and the disquieting tables given above, the success of Great Britain in face of a combination is by no means as certain as ought to be the case in view of her military policy. That policy in 1901 provided 435,000 men to defend the country against invasion. In 1905 it was altered to a force to defend against a smaller invasion of 70,000 men. In 1906 the Army was organized for service abroad, its passage to be safeguarded by the Navy, while the Navy was to defend the country against everything but minor raids of a few thousands of men. In other words, the Government while cutting down the relative naval strength, demands from the Navy the absolute certainty of successful defence in war.

Personnel.—In 1903, with some subsequent modifications, a system of providing officers was introduced by which there was established a common system of entry and training for the three great branches of executive officers, marines and engineers commencing at 13 years of age. Specialization for the different branches of engineering, marines, gunnery, navigation and torpedo was to commence at about the age of 22 to 23. It is still in some doubt whether the separation of the three great branches will then be permanent or temporary. At one time in 1905 it was decided that complete amalgamation should take place as is the case in the American Navy in regard to the line and engineer officers, but the new Board of Admiralty, with the change of government in 1906, claimed a free hand to defer any decision. Complete amalgamation was urged by the old Board on the ground that otherwise no volunteers would be forthcoming for the engineer branch, as none of the young officers would forego the chance of commanding fleets and ships. The original scheme of common entry and training was held to be justified in practice by the belief that it had succeeded in America, but serious doubts were thrown on this by later information and by the reports of Admirals Melville and Rae, who succeeded each other as head of the American naval engineering department. Historically it was held that the military officer had always combined his work with that of handling the motive power. This is too sweeping a statement, for the sailing period in history was relatively brief, and in a previous period, when the motive power as to-day was internal to the ship instead of external, the oarsmen were separated from the military element. There were the strongest reasons in the period of sailing ships for combining the two functions. The whole art of fighting consisted in bringing guns to bear with the greatest effect, and this entirely depended on watching the sails, taking advantage of shifts of wind, while the men at the guns, who were necessarily under the control of the combatant officer, had also to be used to work the sails. To disable the motive power of an enemy was equivalent to crippling his gun power. Things are absolutely reversed to-day. The motive power is purely mechanical, is completely protected below the armored deck, and is out of sight of the seaman. The latter cannot follow his calling as a

combatant and be in the engine-room at the same time. In addition it was contended that to allow the ordinary officer to take charge of marines would result in the ultimate extinction of the marine whose cost was one-third of that of a seaman, whose discipline was much more reliable, and who, as the annual prize firing returns proved, was the better man at the gun. These in brief were some of the arguments presented by men of such standing and influence that there did not seem to be any likelihood of permanence about the new system of providing officers.

As regards the men, for 50 years they had been entered under a long service system of 12 years. The system has lately been tempered by entering a certain number for shorter periods with subsequent service in the Royal Fleet Reserve, and the latter is also recruited from pensioners who had served their full time in the navy. In 1906 this force numbered 19,500 men. The old pensioner reserve which is to be allowed to die out numbered nearly 6,000 in 1906. In addition there is formed out of the merchant service and fishermen the Royal Naval Reserve of about 28,000 men. Allowing for the Royal Naval Volunteers 3,800 men, and Colonial Reserves in Newfoundland and Australia 1,400 men, we obtain a total of 58,528 in reserve and 129,000 serving in the navy. The tendency is, however, to discourage the Royal Naval Reserve on the ground that it would deplete the merchant service of British seamen during war and that with the large permanent force and Royal Fleet Reserve the country has ample men. It is held that the waste of war is rather one of material than men, and that the result is that if the supply of men in proportion to ships is adequate at the beginning of war it is in excess of requirements after a short period of hostilities, the conclusion being the reverse of that universally acknowledged in the case of land war. Certainly in 1906, following on a policy of rooting out all obsolete vessels the permanent force of 129,000 men was capable of manning all the ships with but slight reinforcement from the reserves. This marks a notable change from the beginning of the 18th century when the manning difficulty was Great Britain's chief concern, so much so as to lead her into a war with the United States rather than sacrifice her system of impressing those who were believed to be British seamen wherever found. At that time enough officers and men were employed on the impress service alone to have formed the crews of half a dozen line of battle-ships while vessels remained out of commission in war for want of men. The habit of looking to the seafaring profession to man the navy on the outbreak of war resulted in large fluctuations. Thus in 1762 85,000 men were borne, whereas in 1773 when England was at peace less than 22,000 were borne. The next year war broke out and the number rose in 1781 to over 99,000. In 1792 or a few months before the French Revolutionary War it was just over 17,000 men and by 1814 it rose to over 126,000. As a contrast it may be mentioned that at the present time while the regular fleets are concentrated and ready to strike an immediate blow, many of the remaining ships of fighting value have a nucleus crew of all their officers and

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skilled ratings. To commission such ships for war is a mere matter of a few hours involved in marching the seamen, stokers and marines from the barracks. The skilled ratings being kept in contact with the ships they have to serve in, break-downs should be less frequent if repairs are attended to, whereas formerly these delays were a feature with newly commissioned ships. The progress in training is equally remarkable, the year 1906 being one of what are popularly called "records" in gunnery as well as coaling. It is interesting to note that in this respect there is a friendly rivalry between the British and American navies, the record for the former with the six-inch gun being 12 rounds in 60 seconds with 11 hits, and for the latter the Pennsylvania's achievement of 17 rounds in 90 seconds with 17 hits. The British record with the 9.2-inch gun is the remarkable one of 10 hits in 11 rounds fired in 90 seconds.

The Admiralty.—It only remains in the short space at our disposal to say a few words as to administration. The Board of Admiralty is organized on a constitutional basis, giving complete cabinet control. The First Lord of the Admiralty decides the duties of the different members. As the board never votes, if there is a disputed point, the First Lord decides, and he can lean on the junior Sea Lord as much as the senior, for constitutionally all are of equal status. The arrangement has worked so well that a recent change by which the junior Sea Lords are ordered to consult and report on all important questions with the First Sea Lord has been sharply attacked. This view of Admiralty procedure was well described by a former First Lord of the Admiralty, Lord George Hamilton, in the House of Commons in 1905:

The Board of Admiralty met for general consultative and advisory purposes, and every Naval Lord was in a position of perfect equality. He attached great importance to that equality of status. It had made the Admiralty efficient, and the want of it had made the War Office inefficient. There were always in the Navy two schools—the young school and the old school—and the probability was that the old school would be more represented by the Senior Naval Lord. If the First Lord was a sensible man and had free access to the inner minds of the Junior Lords, he very often got hold of some idea of the new school, which he put forward in his name and which the Senior Naval Lord accepted, though he might not have been inclined to do so had it originated entirely with the new school.

The drawback is that Parliament has no cognizance of the views of the experts as Congress has through the admirable reports of the chiefs of the various naval departments. A commission under the present Duke of Devonshire 16 years ago urged that the American practice should be followed, but nothing has been done. As Parliament has no expert guidance and the navy estimates can be readjusted between the Treasury and the Admiralty after they have been voted, while no particulars are given of the construction programme, which does not even indicate whether the ships are to be battleships or armored cruisers, it is clear that Parliament has been deprived of all effective control. The tendency that results is for individual members to object to the magnitude of the naval estimates rather than to discuss the reasons which have guided the government in presenting them.

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British Navy. Former histories were mere chronicles of events. The following works may be consulted with advantage: Colomb's 'Naval Warfare'; Mahan's 'The Influence of Sea Power upon History'; 'The Influence of Sea Power upon French Revolution'; White's 'Cantor Lectures at the Society of Arts on 'Modern War Ships'; 'The Naval Annual' (1886 to the present day); 'Journals of the Royal United Service Institution'; 'Transactions of the Institutions and Admiralty Instructions' (1906); 'The Navy Records Society'; Clowes', 'The Royal Navy' (5 vols.); White's 'Naval Architecture'; The Royal Navy List (quarterly).

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38. Great Britain—The British Army.

The Regular Army.—The British Army is in many respects like the British Constitution. It has grown, it has not been made. No single idea has dominated its history, no directing mind has prescribed its form or defined its functions. But while the forces, which formed and moulded the British Constitution, and made it from time to time the reflex of the prevailing opinion of the British people, have exercised a constant pressure—a pressure which has never been relaxed—the forces which have produced the British Army of to-day have been intermittent and irregular. The history of the British Army is a long record of the vicissitudes of public favor and public neglect. To a nation in whose long history the gates of the Temple of Janus have rarely been closed for a decade, each new war has come as a surprise. Every war, whether it has ended in victory or defeat, has furnished the British people with lessons which they have vowed to learn and never to forget, and which they have invariably forgotten before the ink has dried on the peace preliminaries. Every war has brought with it good resolutions born of anxiety and alarm, and every peace has produced the apathy, the neglect and the self-confidence which are the outcome of real or fancied security.

It would be unjust, and untrue to historical teaching, to infer from these facts that the British are an unwarlike, or, in all their public concerns, an improvident people. The population of the United Kingdom is composed of warlike races, and in regard to the conduct of public affairs it cannot be said that England

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has been behind the rest of the world. But it is possible to be a warlike without being a military nation, and there can be no doubt that the scientific evolution of a consistent military policy in the United Kingdom has not kept pace with other branches of national development.

The reason is not far to seek. An insular position and the immense protection afforded by a powerful navy have relieved the inhabitants of the British Islands from the dangers which ever threaten the great nations of Continental Europe whose long land frontiers expose them to attack by an ambitious and unfriendly neighbor. For nearly 300 years the people of England have been spared the knowledge of what war on their own soil actually means. While from Brest to Moscow, from Bergen to Gibraltar, every part of Europe has rung to the tramp of hostile soldiery, and has been the suffering witness of the tragedy of war, the dwellers in English counties carry back their immemorial tradition of undisturbed peace to the day when Oliver Cromwell won the last great battle fought on English soil on the field of Worcester.

Once, and once only since the creation of modern firearms did the people of England come in contact with the realities of war. In 1645 Parliament in conflict with the king found itself confronted by the necessity of fighting, or surrendering to an implacable enemy. Following the custom of the country, the House of Commons sought at first to meet the emergency by the aid of amateur soldiers, maintained by voluntary contributions. But the logic of facts soon convinced them that war cannot be trifled with. The "New Model" Army was called into existence by Act of Parliament, funds were provided by vote of the House of Commons, compulsory service was imposed when volunteering failed to produce the required number of men; and the recalcitrant were hanged. A Regular Army was called into existence, and that Regular Army almost immediately became a "Standing Army." It is from the days of the "New Model" that the history of the Standing Army of England really dates. War on English soil taught its lessons to a practical people. To the Commonwealth England owes, not only the establishment of her Standing Army, but the actual groundwork of the military institutions of the present day. One of the most famous regiments of the British Army, the Coldstream Guards, came into existence at this time; and the very establishment of the modern British Cavalry and Infantry regiment is practically what it was made by Oliver Cromwell and the soldiers of his day.

In 1651 the Civil War ended. In 1658 Oliver Cromwell died, and a military *Coup d'état* placed Charles II. on the throne. Never since that day has a British Parliament legislated for the army with a knowledge of war borne of experience. A generation grew up which had forgotten the lessons of Marston Moor and Worcester. The reaction was prompt, and its effects far reaching. The army soon came to be regarded as an evil, scarcely a necessary evil. The soldier soon learnt that the utmost he could expect was toleration. The accession of a foreign king surrounded by

Dutch guards increased that antipathy to the army, which for the next two centuries marked the proceedings of Parliament. In 1689 was passed the first Mutiny Act. The primary object of the Act was to confer upon the sovereign the right to punish certain military offences not dealt with by the ordinary law; but the Act contained a section of a totally different purport. The words which have become famous run as follows: "The raising or keeping of a Standing Army within the United Kingdom of Great Britain and Ireland in time of peace, unless it be with the consent of Parliament, is against law."

The law as passed in the time of King William III. is to this day solemnly re-enacted every year by Parliament, and the illegality of maintaining a Standing Army is palliated by a special Act of Dispensation for one year only. This annual performance has become a meaningless anachronism. The necessity for maintaining a Standing Army in time of peace is no longer questioned or questionable, and the army itself has long ceased to be the instrument of a sovereign, and has become the servant of the nation. But the original passage of the Act and its renewal by many succeeding Parliaments is typical of the tone and temper of the Legislature toward an institution which is as essential to the safety and welfare of the State as Parliament itself.

The result of this want of sympathy between Parliament and the army is very noticeable. The favor of the Legislature, and the funds which that favor can alone provide, have been available during periods of crisis and national danger: They have been grudgingly given or withheld in those intervals of peace which ought also to be intervals of preparation. As a result there has been an absence of continuity, and of deliberate adaptation of means to ends, which has greatly interfered with the proper development of the military power of Great Britain, and have provided her with military institutions which bear upon them the unmistakable evidence of their having been created at haphazard, altered to meet political rather than military exigencies, and adapted to meet a single emergency rather than to deal scientifically with the work of a world-wide empire.

Under these circumstances the services which the Regular Army of Britain has rendered are indeed a marvel. In every land and under every sky, against the highly trained armies of Europe, against the half disciplined hosts of Oriental princes, against savage tribes, formidable by reason of their fanaticism, courage and numbers, the Regular Army of Britain has fought with varying fortunes but with never failing tenacity and devotion. There is no soil which does not cover the grave of the British soldier. In the broad valley of the Danube, on the plains of Belgium, on the shores of the Black Sea, in the passes of Spain, among the vineyards of France they are to be found. The "Redcoats" have fought and died on the plains of India, under the walls of the imperial cities of China; on the heights of the Saint Lawrence; in the valley of the Hudson; under the ramparts of New Orleans; in South American cities; before the stockades of the Maori in

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New Zealand and in innumerable islands in every sea. On the great African Continent, North and South, East and West, from the Pyramids to Table Mountain; from the blazing shores of the Red Sea, to the swamps of the Gold Coast and the Niger, they have obeyed orders, and laid down their lives for "the safety, honor and welfare of their Sovereign and his Dominions." But they have not died in vain. If it be true that the tap of the British drum follows the rising sun round the world, it is true also that the planting of the British flag in five continents is largely due to the patient heroism of the British soldier. Rarely commanded by generals of exceptional genius; almost invariably suffering from the apathy and neglect of Parliament in peace time, and from the faulty administration in war which is the certain result of neglect in time of peace; the British soldier by dint of certain great qualities which he possesses has held his own. To the Regimental Officers and to the Non-Commissioned Officers credit is above all due. They have been, and still are, the true strength of the British Army.

What is the nature of this Army which has suffered and accomplished so much? In its character and composition it is as unique as the circumstances which have created it. There may be better armies than the British, there are undoubtedly worse armies, but there is no army like it. It shares with the Army of the United States the peculiarity of being recruited by voluntary enlistment and not by compulsion in any form. It has a further peculiarity which, until recent foreign conquests planted the Stars and Stripes in the China Seas, distinguished it even from the Army of the United States. Nearly half of the Regular Army of Britain is maintained on a war footing in time of peace, is maintained in distant lands, and to a large extent in tropical or sub-tropical countries. The population of India is 300,000,000 and the military force which defends the great Peninsula and keeps the peace from Quetta to Cape Camorin does not exceed 231,000 all told. Of these 78,000 are British soldiers enlisted within the United Kingdom; the remainder are the troops of the Indian Army, 152,825 natives commanded by British Officers. There are also 14,917 "Imperial Service" troops raised by Native States and held at the disposal of the government; 20,731 Reserves of the Native Army, and 31,966 white volunteers. South Africa, the Mediterranean fortresses of Gibraltar and Malta, the distant Eastern Ports of Singapore and Hong Kong, make further demands upon the Regular Army. In 1910-11 there were 121,099 British troops serving abroad. It is the necessity for maintaining this great force abroad that makes the British Army essentially a voluntary Army. Conscription for service abroad in time of peace is impossible. The young soldier cannot endure the climate of India, and a youth enlisted at eighteen, must perforce remain for two years at home before he becomes physically qualified for foreign service. This fact not only makes it necessary that the service should be voluntary, but that it should be long and that it should greatly exceed the limit of two years which is the term now accepted in the principal conscript armies of the world.

For this voluntary Army there are enlisted on an average 38,000 men a year. The total is sometimes exceeded; there is rarely any diffi-

culty in reaching it. There is no reason why there should be a difficulty. The old prejudice against military service due to the savage conditions of the soldier's life, his scanty pay, his squalid surroundings, lived long and died hard; indeed it is not altogether dead yet. But the life, pay, and prospects of the British soldier at the present day are such as may reasonably attract young men of spirit and ambition. The pay itself, though not excessive, is good. An Infantry private of 20 years of age serving at home receives on an average, week in and week out throughout the year, 11/7d. (\$2.50) in cash after every deduction has been made for "stop-pages" compulsory and voluntary. When the soldier receives his pay every need has already been provided for. He has been clothed, fed, housed, doctored, and educated; his general health has been looked after, his amusements furnished. If he chooses to remain in the Service his pay increases with every step in rank; and, if his conduct be good, he may look forward with certainty to retirement at the age of 39 with a life pension. It is not true to say that all the recruits who enter the Army are good, or that they all become useful soldiers. Many are not good, and never become so. But the unfit are soon eliminated and the quality of the special branches, the Royal Engineers, the Royal Artillery, the Cavalry and the Guards is very high. A British regiment returning from India after a long tour of service in that country, will bear comparison with any body of fighting men of equal numbers in the world.

The Regular Army of the United Kingdom consisted, October 1908, of 10,700 officers, 13,000 warrant officers, 239,300 non-commissioned officers and men, or a total of all ranks of 251,300 men.

Arm	Regular Army	Army Reserves	Special Res. and Militia	Territorial Force	Total
Infantry, including Foot Guards	150,000	91,000	58,100	122,300	421,400
Cavalry and Yeomanry.....	20,800	8,800	500	22,200	52,300
Artillery.....	48,200	21,700	11,000	28,900	109,800
Engineers.....	9,300	4,700	1,400	10,300	25,700
Others.....	23,000	7,700	600	13,500	44,800
Total officers excluding Non-Com.....	12,000	.....	1,900	8,400	.....
Grand total.	251,300	133,900	71,600	197,200	654,000

In addition there were about 3,300 men on the staff and miscellaneous establishments of the regular army; 2,000 on the permanent staff of the territorial force; 1,800 militia reserves and about 5,600 militia and volunteers in the Channel Islands, Malta, and Bermuda.

The ordinary period of Color Service in the British Army varies from six to nine years, but the Brigade of Guards are enlisted for three years with the Colors, the men having the right to prolong their service to eight years. Soldiers are generally permitted, if their conduct has been good, to extend their first term of service and to remain with the Colors for 12, and in some cases, for 21 years. In addition to the men with the Colors there are the men forming the Army Reserve. The Army Reserve is an outcome of the great reform accomplished

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by Lord Cardwell in 1870. That distinguished War Minister was the first to divide the soldiers' service into two periods, the first with the Colors, the second in the Reserve. The Reservist is liable to be recalled to his Regiment in case of war or national emergency only.

The recruits for the Regular Army are drawn from all parts of the United Kingdom, as well as from the colonies.

The birthplaces of non-commissioned officers and men, excluding Indian native troops, according to the figures for 1908, are as follows:

	Number	Per cent. of total
England.....	181,300	77.0
Wales.....	3,400	1.4
Scotland.....	18,500	7.9
Ireland.....	23,200	9.8
India and Colonies.....	8,500	3.7
Others.....	400	0.2
Total.....	235,500	

The Territorial Force.—The British Army formerly comprised the Regular Army and the "Auxiliary Forces," the latter including the Militia, the Yeomanry, and the Volunteers. Since 1907 it consists of the "Regular Army" and the "Territorial Army." The term "Regular Army" is applied to the regularly embodied troops, and the army reserve.

The "Territorial and Reserve Forces Act" of 1907 abolished the militia as such. Of the 124 Militia battalions in the United Kingdom 74 were converted into reserve battalions of the Regular Army, viz.: 66 as 3d battalions of the 66 line regiments (of 2 battalions each), and 27 as 4th battalions to the same number of regiments. The Militia Artillery has become, with the exception of certain Irish battalions, units of reserve field artillery, and the Militia engineer battalions are now turned into reserve siege and railway companies.

All men of reserve units, whether originally militiamen or directly recruited, are enlisted as "special reservists" of the Regular Army. That is to say, they are partially trained in time of peace, and are available for transfer to the Regular Army in time of war, if required. The period of initial, or recruit, training is six months for all arms, followed by an annual training of fifteen days, with the addition of six days' musketry for the infantry. The 3d battalions also do the work of regimental depots, which have been abolished. They are, in fact, training battalions, supplying material to the battalions of the first line both in peace and war. The 27 fourth or "extra" battalions are available for service abroad, in event of war, as entire units. The regular field artillery is also provided with training units, one group or "brigade" of three batteries for each of the six field divisions. These units train the special reservists for the artillery, and are to supply the ammunition columns on mobilization. Fourteen reserve cavalry regiments are also to be formed.

The Yeomanry, styled since 1901 "Imperial Yeomanry," and the volunteers, have changed their status. They now form the cavalry and infantry of the territorial army, which also

comprises a proportionate strength of artillery (newly created) including horse and field batteries.

Recruitment for the territorial army is entirely voluntary, but the conditions are slightly more onerous than heretofore. Men joining the territorial forces are attested and enlisted instead of simply enrolled. The age for enlistment is from 17 to 35 and the period of engagement four years, with the option of re-engagement for further periods, not exceeding four years, in each case, up to the age of 40.

Discharge can be obtained at any time by giving three months' notice and paying £5, but both notice and payment may be dispensed with in special cases. Training is on "Volunteer lines," that is to say, there is no period of continuous training for recruits, as in all other national militias, and the annual training is 15 days in camp as a maximum, and 8 as a minimum. Other drills and rifle practice are carried out in the men's own time. Absence from training, or failure to complete the necessary number of drills, renders the territorial soldier liable to a fine of £5 or less, according to circumstances.

The territorial army is organized in 14 divisions and 14 cavalry brigades, the composition of which is similar to those of the Regular Army. Each of the higher units has, or will have, its proper proportion of artillery and ammunition columns, medical and other subsidiary services. The officers, except the divisional generals, and some of the brigadiers and staff officers, are non-professional. A scheme for the provision of officers by means of officers (volunteer) training corps has been instituted. These training corps are merely the pre-existing Volunteer Corps at the Universities (senior division) and the similar school cadets (junior division).

All ranks of the territorial forces receive pay when called out, at the same rates as in the Regular Army. A reserve for the territorial army has been approved. It is open to all who have served in the territorial army or in the old volunteers for 4 years, up to the age of 40.

The general officers of Commands are responsible to the Army Council for the training of all the troops in their Commands, but the administration of the territorial army is vested in County Associations, which stand in much the same relation to the territorial forces as the War Office does to the Regular Army. That is to say, they undertake the raising, equipment, and maintenance of the force. They are also charged with the care of reservists and discharged soldiers. Each County Association has its own budget, the funds being provided by the War Office on regularly prepared estimates, based on previous expenditure under the various approved heads. On mobilization, the units which are to take the field (called the field army or "expeditionary force," comprising about four fifths of the regular force at home, are brought up to full war strength by the incorporation of the reserves. At the same time the special reservists are called up and fill the 3d and 4th battalions of infantry regiments and other reserve units. A small proportion of these men (7,359) at once join the field army for service with the

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ammunition columns, etc. The remainder will be available, after further training, to supply losses in the field. The territorial army, also, is to be embodied whenever mobilization takes place, and is then to undergo a training of 6 months, after which it is supposed that the force will be ready to meet the enemy in event of an invasion. A certain number of territorial forces belonging to the subsidiary services (5,102) are expected to volunteer at once for the field army, and it is hoped that others may do so if their services are required.

It will be observed that, for the first time in the history of the British Army, the necessity for creating a secondary reserve (answering to the Ersatz, or supplementary reserve of continental armies, to make good the waste of war), has been recognized. The formation of an organized territorial army is also a great step in advance. On the other hand there will be no second line* (properly so called) except the 27 fourth battalions, and it has unfortunately been found necessary to accept recruits for the special reserve at 17 years of age. Consequently a considerable proportion of this reserve will not be available for the purpose for which it was designed.

According to the estimate for 1910, the number of regular troops at home was 136,302; the number abroad, 121,807. This did not include the establishment of the native army in India, which consisted of 165,000 men of all rank, and which would have brought the total force maintained abroad to about 300,000, all battalions in India being practically on a war footing. The following table shows the establishment of the regular army, exclusive of India, according to the latest estimates:

Branches of Service	Officers	Non-Commissioned Officers, etc.	Rank and File
General and Departmental Staff.....	1,005	904	17
Regiments:			
Cavalry, inc. Household Cavalry.....	563	1,380	12,524
Royal Artillery.....	1,338	3,060	28,579
Royal Engineers.....	675	1,491	7,248
Infantry, inc. Foot Guard.....	3,451	9,632	82,964
Colonial and Native Indian Corps.....	289	560	7,755
Departmental Corps.....	330	901	1,510
Army Service Corps.....	459	1,367	4,980
Medical Corps.....	692	584	3,363
Additional Numbers.....	.....	300	1,000
Miscellaneous Establishments.....	373	851	242
Total.....	9,759	23,251	150,190

It was also estimated that the total strength of the British army, including the regular army, the army reserves, the special reserves and the territorial army, was 805,173. The total cost of the army, exclusive of the troops in India, was estimated at about \$115,000,000, in 1910.

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39 (a). **Great Britain—England and Europe.** It is the purpose of these observations to explain, as clearly and as briefly as possible, the policy of England in Europe as it has been, as it is, and as, most probably, it will be. In order to elucidate the problem, it is necessary to look, in the first place, exclusively at Europe, and then to turn our eyes to England.

For about five centuries after the fall of the Roman Empire, that is, from the 5th up to the opening of the 11th century, there was one absorbing issue before Europe. That issue was whether European civilization was to continue to exist or not. During that time the Moslems on the South, the Danes, Swedes, Goths, and Norwegians from the Cattagat, and eastward the Slavs and Hungarians swarmed round the dissolving limbs of Christendom, so that Christendom bade fair to disappear. As Baronius said, "it was as if Christ slept in the vessel that bore mankind." The 10th century brought Europe nearest to destruction. But about the year 1000 an almost magical change began to operate. Invasion ceased. Europe was saved. Since that time external barbarism has often threatened, but never with overwhelming force.

The next epoch of Europe has lasted from the 11th century up to our own day and is not yet concluded. Europeans are busy finding a solution for a problem which has haunted them for eight centuries. That problem is the re-organization of Europe after its almost complete destruction by the barbarians. To the most profound minds two ways of reconstructing Europe have presented themselves. The first was to amalgamate this small continent under one supreme authority, and to do what the statesmen of China and of America have achieved so admirably for China and the United States. Great prestige has attached to that solution because the Romans had carried it out to a large extent already with fair political results. But the solution has derived its fundamental au-

* The territorial army is frequently spoken of as the "second line." But the bestowal of this title does not enable the force to fulfil the functions of the second line of Continental armies.

thority from the fact that there is a certain amount of reasonableness and utility in the idea of having one sovereignty to control the peninsula which Europe is.

The chief exponents of this great idea can easily be named. First, there was the mediæval Papacy which, springing up in the 11th century, claimed universal sovereignty as a right. As Pope Gregory VII. said at that date, the Papacy is the Master of Emperors. Then in the 13th century, when the mediæval Papacy had fallen, the French monarchy made a similar attempt. Mathew Pavis, Peter Dubois, and Jandun all agreed that France was the new claimant to universal power. Later Pope Urban, in 1382, pointed out that "France desires the universal monarchy of the world."

The next successor in the field was the House of Hapsburg. That family fought for this idea during two centuries, from the middle of the 15th to the middle of the 17th century. "Austria's mission is to rule the world," was their motto, and their greatest prince was Charles V. They came in course of time to rule both at Vienna and at Madrid. The two branches of the house were intertwined together. Together they fell. The decline of the German branch was registered by the peace of Westphalia in 1648, and that of the Spanish branch by the peace of the Pyrenees in 1659.

The next power which strove to raise from the ground the broken sceptre of the Cæsars was France again, under Louis XIV. Louis inaugurated their policy in 1661. This dream of French supremacy in Europe was consistently pursued by France up to 1815. Its consummate exponent was Napoleon, who claimed to be the heir of the Cæsars. In the summer of 1808 he attained the nearest to his ambition when he told Talleyrand that he was now "master of Europe."

After Napoleon had fallen in 1815, Russia succeeded to his aspirations. In 1812 she had extinguished the ambitions of Napoleon in the Russian snow. The last two centuries had been a route march for her, East as well as West, South as well as North. Her day had come she thought. But that is not so certain. The Crimean War showed her to be not so strong as she imagined, and since that date, Germany, under Prince Bismark, has arisen to dispute the title. Michelet once described Germany as the India of Europe, vast, vague and unsettled. All that was ended by the man of blood and iron. We will not pronounce whether European supremacy rests at this moment with Russia, at the head of the Dual Alliance, or with Germany at the head of the Triple Alliance. Probably it inclines toward Germany. However that may be, the struggle for the supremacy lies at present between these two powerful champions. Of the two, Germany appears to claim it with more zest and resolution.

But in spite of all these constantly renewed ambitions to grip the supremacy of Europe, all aspirants to supreme dominion have failed. No one has been strong enough to reconstitute the empire of Rome. What force has thwarted this consummation? It is the force of nationality. The issue before Europe has been the issue between despotism and freedom. Freedom has won. Europe has chosen to organize herself into a number of mutually independent nations, some 20 in number, rather than to place herself

in subjection to one supreme authority, whether of Pope or of Emperor.

The definite appearance of the national spirit, and therefore of nations, may be dated from the 13th century. At that time a whole cluster of young nations appeared on the horizon, like a group of islands, Hawaiian or Philippine, desecrated far out at sea. Some were powerful, such as France, or insignificant, such as Austria; some monarchical, such as Castile, or republican, such as Florence; some Slavonic, such as Poland, or Romance, such as Aragon; or Teutonic, such as Holland; some dying like the Arelate, or full of the germs of progress, like Brandenburg, or precarious, like Hungary. What a bewildering scene! What an inextricable task to follow the dance of these atoms for seven centuries up to our own day, as they coalesce and disperse and again amalgamate into the nations which we know so well!

Enough has been said to make quite plain what the main history of European politics really is. It consists of a conflict between two theories of government embodied in men's passions. One theory proclaims the advantage of unity under one authority. The other theory announces the goodness of nationality of freedom, of a Europe split into many independent sovereignties. Since the 11th century Europe has been rent by this question. Wars innumerable have been fought over it. Such has been the fearful legacy of ambition left by the Cæsars to the barbarians.

Having now indicated the nature of the politics of Europe, let us turn to England, this minute speck of an islet off the European coast. What has been her policy as regards this continent? Japan, an island similarly situated, has enjoyed an easy time, because China, on the coast opposite, has been the most peaceable neighbor in the world. But, as for us, we have been faced by the most savage and quarrelsome races, the scum of Asia, almost always at war. Therefore, we have had perforce to take our part. We have had imperatively to say whether we should side with autocracy, as represented by the Pope, by the Spanish Armada, by Louis XIV., by Napoleon, by the Czar Nicholas, and by Bismark; or whether we should side with the force of freedom ever ready to resist these powers. It has been somewhat a hard choice. We have often tried to shut our eyes and take no part. We have sometimes taken the side of power and authority, as James I. did in siding with Spain, or as Charles II. did in siding with France. But, on the whole, since the days of William the Conqueror we have sided with freedom. For the liberties of Europe ever coincide with the interests of England.

Our reason for siding with the liberties of the Continent has been a practical business reason. We know perfectly well that the day of the amalgamation of Europe under one authority is the day of our destruction. We are not strong enough to maintain ourselves against a whole hostile continent. We fell inevitably before Rome, as soon as Rome had mastered the West. It was only by the most strenuous effort that we saved ourselves from the latest heir of the Cæsars,—Napoleon. Hence it is that we have opposed the Papacy, and Spain, and Louis XIV., and Napoleon, and the Czar. Hence to-day our profound anxiety at the progress of

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German ambition toward Austria and toward Holland. Hence our love of the balance of power in Europe which is a conception rooted in our history, and was as familiar to Henry VIII. and Wolsey as it is in our own hour to any of our foreign ministers. Hence our instinctive love of small states, of Holland and Belgium and Portugal, and Switzerland, each of which is a bar against autocracy and a pledge of European freedom. Hence our "perfidiousness," that is, our aptitude ever to abandon the company of a too dominant star. Hence at this moment our love of France whom we disliked ever since the rise of Louis XIV., but whose successive falls in 1815 and 1870 have brought us at last to her side. Hence our profound and fundamental indifference to European politics, so long as no power is visibly in the ascendant across the Channel. Hence, too, the predominant part which, in all the real crises of European history, England has played. Who but they thwarted the Pope, and the Hapsburgs, and Louis XIV., and Napoleon? Who but they have proved the ultimate obstacle to Czars and Kaisers?

For Americans all this has a good deal of significance. What is to be the policy of the United States in Europe? The interests of the United States in Europe are nothing like so vital and immediate as those of England; but subject to that consideration, they run on parallel lines. It can never be the interest of the United States to be faced across the Atlantic by an united and amalgamated Europe. For, first, that would mean the conquest of England; and next, the power thus organized would be a menace to the greatness of the United States. Just as the United States desires the open door and the balance of power in the Far East, so, and for the same reason, she needs a Europe in which national freedom prevails, rather than a Europe armed under one authority and dictatress of the world. That consideration is not yet materialized in the American mind. But the day will come when it will be materialized and then it will be seen that the identity of the European policy of England and of the United States constitute yet another link between the two nations.

The future of Europe and of England's policy in Europe remains to be considered. At first sight it would seem that never before has the principle of nationality, of freedom, been so firmly established in Europe, or so much revered. There seem so many nations, and all so strong. The project of universal dominion would at first sight appear hopeless. Where Napoleon failed, is it likely that anyone can succeed? If all this be so, then England may rest at peace as regards Europe and devote herself wholly to her duties overseas. Is it so? It is not so. The old problem of eight centuries is still with us, and still must regulate our policy.

First, though nationality has won, Europe is paying a fearful price for this victory. The nations have had to arm to the teeth. They are groaning under their armaments, necessitated by the ambitions still glowing in the soil of our volcanic continent. Hence, on all sides, there is observable beneath the surface a profound reaction against nationality. Those who thus react are called Socialists. Socialism is the reaction against nationality. It proclaims the

brotherhood of man, the disarmament of nations, the unification of labor, and universal peace. The socialist is not a patriot of France, or Germany, or Italy. He is, or thinks he is, a patriot of the world. Such men are the precise stuff of which revolutions are made. They beat down the barriers of Nations. But in so doing they commit a revolutionary act, and clear the ground not for a Mirabeau, but for a Napoleon. This is the foremost danger of which England has to beware in Europe.

Let me put the same fact in a somewhat different light. The pace in Europe is terrific at the present time. The stress of rivalry in armaments is too much for some nations to bear. A progressive nation like Germany can hold out longer than a stationary nation like France, or than an undeveloped nation like Russia, or than a disorganized nation like Austria. Here are the seeds of a European cataclysm. Some nation, fainting in the race for life, may become the footstool of its neighbors and in a moment the balance of power may be upset. Then again will come the call for the power of England.

Against this bad outlook there are two powerful considerations to be set. Socialism, if guided by statesmanship, may, in its detestation of armaments and their evil consequences, achieve a great good. The nations may be induced to draw back in time from their insensate haste to arm. Perhaps the hour of mutual limitation of fleets and armies is nearer than may be supposed. For if things go on in Europe without check as they are now going, men will come to loathe nationality as much as they once came to loathe feudalism. They will tear up its title deeds even as they tore up those of the barons. But it is quite likely that nationality will not thus perish, and that suicide is not to be the sole end of Europe. To arrive at some such happy solution should be a part of our policy in Europe, for, indeed, upon its achievement our ultimate safety depends.

There is a second consideration, pointing the same way. Most of the great nations of Europe and several of the small ones have acquired empire over sea. These empires are inhabited by alien races who, as time goes on, will be found to grow more and more impatient of their foreign masters. Even were it otherwise, and even were the natives to be forever docile and obedient, here is a vast and adequate scope for the energies of Europe which would be thus far better occupied than in the domestic broils which occupied Holy Roman Emperors and most Christian Kings. Besides, the whole wide world east and west, in regions never known by Cæsar, will laugh us out of court for wrangling over the legacy of the Cæsars, now that it is grown so small by comparison. Thus perhaps the new world is solving, slowly but effectually, by distracting our attention to greater issues, the problem of how we Europeans can live together in amity, and how nations may combine peace with freedom. Thus nations will continue to exist and will justify the policy of England in defending them. For humanity, divided by reason of its very greatness, will not soon find its unity once more.

GEORGE PEEL.

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GREAT BRITAIN — FOREIGN POLICY IN INDIA

39 (b). **Great Britain — Foreign Policy in India.** In writing about India one is too apt to presuppose a certain amount of knowledge of the historical, geographical and ethnographical facts of that vast continent, but in the space allotted to this article a large presumption of familiarity with the main circumstances of the British occupation of India is inevitable. There is no time for even a brief sketch of the marvelous story of the British wooing and winning of the great peninsula, which contains nearly one-fifth of the human race. A glance at the map of India will show that others also wooed, but did not win, and will indicate that all paid their addresses at three important points on the long coast line, so singularly lacking in harbors. Near Bombay on the West, the Portuguese still hold the beautiful land of Goa; near Madras on the East, the French retain Pondicherry, and up the Hooghly river above Calcutta, the tri-color still flies over the little settlement of Chandernagore. Dutch and Danes no longer have settlements in India, but these, too, have left their traces. From Madras, Bombay and Calcutta — isolated and unconscious — strenuous traders generated the force, which was in the course of time to create and consolidate one of the most remarkable Empires which the world has ever seen.

There is no time to dwell on the romantic deeds of Clive and Warren Hastings, nor to second the achievements of the various Governor-Generals, who seemed compelled, in spite of themselves, and in spite of their merchant-masters in London City, to advance and advance. Warren Hastings, Lord Wellesley and Lord Dalhousie were the great builders of the huge fabric, known as British India.

Another glance at the map will show that only three-fifths of the Indian continent are colored red. The remaining two-fifths belong to the Indian Princes and are not British territory. If the policy so keenly followed by Lord Dalhousie had not been arrested by the convulsion, known as the Indian Mutiny, it is possible that a considerable portion of the territory now belonging to the Indian Feudatories would have passed by lapse or other causes into British possession. But happily by the wise grant of the right of adoption to the Indian Princes the danger of further annexation disappeared. It will be noticed, if reference again be made to the map of India, that the territories of the Indian Princes are widely scattered. There are large countries belonging to Princes, such as the Nizam of Hyderabad and the Maharaja of Mysore in the South, and there are vast areas held by groups of chiefs such as the congeries of states known as central India; where the great Mahratta dynasties hold sway — Rajputana where the Rajput Princes rule, and the large tract in the Punjab where the Sikh states lie. It is difficult to define the exact relation of the Indian Princes to the crown, but the King of England and Emperor of India may in a sense be styled a "Ruler of Princes." The ties which bind the Indian Princes to the British crown have been described by Lord Curzon:

"They are peculiar and significant, and, so far as I know, they have no parallel in any other country of the world. The political system of India is neither Feudalism nor Federation;

it is contained in no constitution; it does not always rest on a treaty and it bears no resemblance to a league. It represents a series of relationships that have grown up between the Crown and the Indian Princes under widely differing historical conditions but which in process of time have gradually conformed to a single type. The sovereignty of the Crown is everywhere unchallenged. It has itself laid down the limitations of its own prerogative. Conversely, the duties and the service of the states are implicitly recognized, and as a rule, faithfully discharged."

With Lord Dalhousie passed away the policy, and, indeed, the necessity for annexation. The conquest of Upper Burmah, postponed by him and carried out by Lord Dufferin, was under the circumstances unavoidable. There have also been changes in Baluchistan of a political rather than a territorial nature. But with these exceptions, India, from the time when it passed out of the hands of the company of merchants into the keeping of the Crown, has remained content with the frontiers which nature had suggested and Lord Dalhousie had secured. They are good frontiers, and enable a comparatively small force of some 230,000 men to keep the peace, internal and external, of some 300,000,000 people. India has been likened to a "fortress with the vast moat of the sea on two of her faces and with mountains for her walls on the remainder." For the Hindus the "black water," as they call the ocean, was protection enough until the navies came out of the west, while to the north stood the stupendous mountains of the Himalaya. But to the north-west, the frontier, difficult and dangerous though it was, admits of passage, and through the defiles which occur in the marches between Peshawar and Quetta the waves of invasion have often found their way. And so long as Great Britain holds command of the sea, it is only through the northwestern frontier that India can be threatened.

Since 1857, the year of the Indian Mutiny, the chief preoccupation of the Viceroy has been the internal development of the vast and varied continent, split up into so many distinct countries and peopled by races of extraordinary diversity. The terms "India" and "Indian" are too often used with most misleading results, and it would be as safe to predicate anything of "India" and the "Indians" on any subject ranging from politics to weather, as it would be to generalize on Europe and the Europeans. The only thing in India which is the same and universal is the system of Government, and many are of opinion that in this sameness and uniformity there is danger. But uniformity on the whole tends to efficiency and is economical, and since India passed under the direct control of the Crown the exigencies of finances have rendered strict economy essential. It would be difficult to find any part of the world, where government is carried on so cheaply as in India. Some 1,000 officers of the Indian Civil Service manage the affairs of some 230,000,000 people in British India, and have occasionally an indirect influence on the welfare of the remaining 70,000,000 who live in the territories of the Indian Princes. British India is divided into large administrative areas known as Districts.

and in the whole world there is no such work as that of the District Officer. Often isolated from his countrymen he toils day and night for the people committed to his charge. They look to him for everything and in their own language he is their Mabáp—their Mother and Father. His one idea is that they should not be harassed or worried whether it be by tyrannous neighbors, by exacting underlings, or by an overzealous Government. He is usually conservative in his views, and his one hope is the hope of his clients that the rain shall fall in due season, and that there shall be a bumper harvest. The District Officer at his best is rarely seen except by the people away in the villages. Viceroys and distinguished travellers cannot see him at his real work, but for all that they quickly learn that the good Government of India ultimately depends on the good District Officer. Perhaps the best critics of English administration in India are the French, and they have borne generous testimony to the system, and wonder at the fewness of the Civil servants. As it is in the Civil Service, so it is in the other many efficient departments of official work: the British officers are few,* and their work and responsibilities are enormous. It is due perhaps to the responsible nature of the work that the strenuous life prevails in spite of climate and solitude.

Far away from the Districts, from the canals, railways and forests, where men live their solitary lives on salaries none too generous, there is a military cantonment with a mixed Brigade of British and Indian troops. Strong as may be the District Officer, and unquestioned as may be his authority among the people, the knowledge that there are soldiers of the fair faces and guns within a few hundred miles undoubtedly acts as a sanction, and a steadying influence on the unruly spirits and latent forces of disorder, ready in every District to spring if there be the least sign of weakness.

The Oriental respects most of the respectable qualities, but to him the great quality is strength. And though we pride ourselves on justice, though we labor to make the Indians more prosperous, though as trustees we spend India's money on railways, irrigation, canals and education, though we toil to remove all real grievances, and tax our brains to defeat famine and plague, it all goes for nothing unless there be strength—power manifest and actual. There is a word in use throughout India—Ikbál. If the Ikbál of the Sirkar is good, that is if the prestige of Government stands high, all is well. But if it is shaken all the splendid structure which the British have raised in India will also be sorely shaken. It is the knowledge of this prestige and its power, and the sense that it must be inviolate, that brings anxiety and pause to a Viceroy and his Government, when some reform really touching the people or some military operation to quell a turbulent clan on the frontiers is under discussion. In India risks must be run, but caution is the characteristic of the Indian bureaucracy. It is this same knowledge of prestige and of what is connoted by the

loss of it, which has hitherto made for continuity of policy, and has kept India out of the arena of party strife in England. For, once be-little a Viceroy, a Lieutenant Governor, or even a District Officer, and a blow is struck at authority which reverberates through the astonished minds of millions. Authority, power, prestige are all summed up in the word Ikbál. That is the word on which the astonishing miracle—the rule of 300,000,000 by a mere handful of men—rests. Justice, benevolence, an almost missionary zeal to improve the condition of the people are mere incidental attributes.

It is a commonplace to say that the average Englishman knows nothing of India and its problems, and it is rare to find a man who can visualize the Indian people unless he has visited the East. The statesman with the poetic imagination and the literary gift may sometimes project himself into the jungle of India religions, tribes, castes, languages and customs, but the Burkes, the Max Müllers, and the John Morleys occur but seldom. And yet no Government is richer in official literature than the Government of India. There are mines of information awaiting the student, for every official is perforce a writer of reports. There will shortly be published a work known as the Gazetteer of India which will give to the world the conditions and vital statistics of the most remote parts of the Continent. Every ten years there is published the report of the Census of India, and a very cursory reading of that most interesting work will reveal the curious and complex charge which devolves on the Viceroy and his Government. The student will be staggered when he learns the number of religions, languages, tribes and castes which exist in India. He will recognize that India is a vast conglomeration of innumerable differences. But he must see the people before he can realize the gulf which lies between the Sikh and Pathan, the Mahratta and the Bengali. Lord Curzon explained it in his speech at the Guild-Hall in 1904: "We have to deal in India with races that are as different from each other as the Esquimaux is from the Spaniard or the Irishman from the Turk; with creeds that range between the extreme points of the barest animalism on the one hand and the most exalted metaphysics on the other, and with standards of life that cover the whole space between barbarism and civilization."

It is no easy task to give equal justice to all these varieties of the human race, but the task is fairly faced, and the wise rule of religious tolerance, and the scrupulous respect which is paid to Indian customs, make possible the Government of India. But though the differences are great there are solvent forces at work which may at no very distant date make for homogeneity in certain localities, and the close of one century and the beginning of another seems by some curious reason to be the signal for change. Some few years ago it was the fashion to suppose that the people of the two great religions of India—the Hindus and the Mussulmans—would never work in harmony. It was similarly supposed that the manly races of the Punjab would never co-operate with the unwarlike people of lower Bengal. Undoubtedly many of the propositions which used to be accepted without challenge must be modified. Railways, travel in

* The work of the Civil administration of India is carried on by 6,500 British, either brought from abroad or recruited in India, and by 21,800 Indians. These figures leave out all on lower pay than £60 per annum.

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Europe, education and a free press have worked important changes, and it is plain to the writer, who has had opportunities of revisiting India after periods of absence sufficiently long to enable him to notice changes, that the Government of the future will have to reckon not with an homogeneous India, but with an increasing number of educated Indians scattered over the continent who are groping after ideals. It will be the problem of the Indian statesman to find them these ideals, and to give them some safe scope for their activities. The progressive Indian realizes that India depends on the British connection. He wishes to take part in the Government of India, and to enable India to take her place among the self-respecting nations of the world. He points to Japan, and the defeat of Russia and the Anglo-Japanese alliance have naturally caused a ferment in India. But the progressive Indian—like the ordinary Englishman—will not grasp the radical point, that there is no India and no nation of Indians. If political power is to come to the educated classes—the microscopic minority of the millions, it must first come from small beginnings, from the village and the town. They cannot jump at once into the control of an Empire. The progressive Indian is, so far as he can be judged by his conversation and his public speeches, loyal to the Crown, but unfortunately his organ—practically the whole of the native press—is undoubtedly preaching sedition and poisoning the mind of the rising generation against the Government. With some honorable exceptions, there is no sense of responsibility, and still less of dignity in the native press, and though the editors are in some cases merely making believe and ploughing the sands, their teaching tends to conflagration, and they must know that they are playing with fire. Yet the leaders of the progressive party would deplore a conflagration, for they and theirs would be the first to be overwhelmed. It needed no prophet to point out as did Mountstuart Elphinstone years ago that bureaucracy and a free press were incompatible, but the problems of finding the ideal for the intellect of India must now be grappled with and the good humored indifference of a strong Government toward a virulent and hostile press is no longer safe. This somewhat lengthy but still incomplete preface to the subject of my article, "Foreign Policy in India" is necessary since it is impossible to deal with the Foreign Policy of India as a thing separate and apart from India. Up to the end of the 19th century Indian foreign policy was treated with great reticence. There may have been some policy, but it was known to few. But at the beginning of the present century Lord Curzon, Viceroy of India, who believed in taking the people into his confidence, departed from the old-fashioned reticence, and in several memorable speeches formulated the problems of the defence of India. No one was ever more qualified to expound these problems. He had made them his life study, and his intimate knowledge of the countries beyond the frontier, acquired by travel, coupled with his wonderful grasp of every detail of Indian affairs, enabled him to co-ordinate isolated facts and events, and to establish India's position on the board of British foreign policy.

He pointed out that up to the last 15 years the foreign relations of India were practically confined to her dealings with Afghanistan and to the designs or movements of the great Power beyond, and the foreign policy of India had little to do with any other foreign nation. "Now all that is changed and events are passing which are gradually drawing this country, once so isolated and remote, into the vortex of the world's policy, and that will materially affect its future." Consolidation on the frontiers involved more direct relations with the countries beyond, but more than that. "Europe has wakened up, and is beginning to take a revived interest in Asia. Russia with her vast territories, her great ambitions, and her unarrested advance, has been the pioneer in this movement, and with her or after her have come her competitors, rivals and allies. Thus, as all those foreigners arrive upon the scene and push forward into the vacant spots, we are slowly having a European situation recreated in Asia, with the same figures upon the stage. The great European Powers are also becoming the great Asiatic Powers. Already we have Great Britain, Russia, France, Germany, and Turkey; and then, in place of all the smaller European kingdoms, and principalities, we have the Empires and States of the East, Japan, China, Thibet, Siam, Afghanistan, Persia,—only a few of them strong and robust, the majority containing the seeds of inevitable decay. There lie in these events and in this renewed contact or collision, as the case may be, between the East and the West, omens of the greatest significance to this country." Again, "A land frontier 5,700 miles in length, peopled by hundreds of different tribes, most of them inured to religious fanaticism and hereditary rapine,—a single outbreak at a single point may set entire sections of that frontier ablaze. Then, beyond it, we are brought into direct contact with the picturesque but perilous debility of independent, or quasi-independent, Asiatic States, some of them incurably diseased and hastening to their fall; and behind them, again, are the muffled figures of great European Powers, advancing nearer and nearer and sometimes finding in these conditions temptations to action that is not in strict accordance with the interests which we are bound to defend."

But after all English foreign policy in India is largely a matter of finance, for it must be based on the contentment of the people. It can be asserted with deliberation that the system of taxation in India is fair and considerate, but there are millions who live on a very slender margin. In normal years when the rains are favorable there is rude plenty in the land; but when the rain fails, and when, later, famine is declared, the numbers who flock to the famine camps are proof that among the poorer classes there is little or no reserve. It is, therefore, incumbent on the Viceroy—whose duty is to keep India safe and contented—to ensure peace on his long land frontier of 5,700 miles. He can engage in no policy of adventure and he cannot lightly undertake even a small expedition, for he never knows whether a local disturbance may not set the frontier in a blaze for hundreds of miles. He has to consider the revenues and the economic requirements of India, the policing of the Provinces, and the obligatory garrisons, and

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he knows that if his calculations are correct that he has only a certain amount of force for the extended defence of the Indian Empire. Those fierce critics of Government—the editors of the native press—who write at the safe harbors where shots have not been fired for generations, maintain that the military forces of India are excessive, and they point with some justice to the fact that during the war in South Africa and the operations in China the garrison of India was seriously depleted. It was a risk, but no Viceroy can hesitate when the British Empire calls, and the splendid conduct of the people and Princes of India justified the confidence reposed in them. But the army, judged by whatever standard,—by the size of the continent, by the population, or by the trade and wealth of India,—is none too large, and if operations of magnitude ever take place on the Northwestern frontier, the forces which can be spared from the obligatory garrisons will merely be able to hold on for a limited period until reinforcements arrive from over sea. The Army of India is composed of British and native troops. Experience demands that the proportion shall be one British soldier to two Indian sepoys, and that the artillery shall be entirely British. The British soldier in India is expensive, the Indian sepoy cheap, perhaps the cheapest and for his pay the best and most efficient soldier in the world. Life in the army has hitherto appealed to the manly tribes. It was an honorable career, it was possible to save, and there is a pension at the end of the service. But the general rise in wages throughout India, the comparatively speaking lucrative employment which is offered in various directions, and the certain chances presented by agriculture in the canal colonies have somewhat changed the prospects of service in the Army. Simultaneously the great efforts which have been made of late to obtain a high standard of efficiency have diminished the amenities of the sepoy's existence, and it is possible that the difficulties of recruiting which beset the authorities in England will ere long appear in a modified form in India. At any rate, in spite of the fact that India is still, notwithstanding the changes wrought by civilization, and the *Pax Britanica*, rich in man power, the sepoy will become more expensive, and however menacing the situation on the frontiers may be, it will be difficult on India's present financial basis to increase the standing army. There are, however, other forces than those of the Regular Army in India. On the frontier Lord Curzon, chiefly from political reasons,—the policy of conciliation instead of exasperation,—has offered to the wild youth of the frontier service in Militia Regiments, while many of the greater Princes have voluntarily contributed highly trained troops for the defence of the Empire. These forces are trained by British officers, and have won high praise on service. They are known as the Imperial Service Troops, and are quite as efficient as the regiments of the Regular Army. But in spite of India's resources in man power, in spite of the loyal co-operation of the great Feudatories, the Indian Government cannot be expected, single-handed, to provide for the defence of what has been truly called the "strategical frontier" of the British Empire. India

must look to Great Britain in times of supreme danger, and in the matter of foreign policy India is merely an agent of the British Government. The Viceroy and his Government are responsible as local agents for Indian territory where it marches with Turkey, Russia, China and France, for the Persian Gulf, and for relations with Afghanistan. The ideal is that the glacis of the fortress should be sterilized or neutralized, but with European powers pushing East, and with decaying and moribund Asiatic States as our neighbors, this ideal will not be realized save by armed preparation and a resolute front. Opinions differ as to the policy on the Northwestern frontier. The scientific soldier is in favor of daring measures and would occupy advanced posts in Afghanistan to check a Russian invasion, and apart from military consideration there is an obligation to defend the Amir of Kabul from attack, and there is the belief that the advance of Russia to the near neighborhood of India would injure the prestige of Government in the eyes of the Indians. Against this policy is the awkward fact that as things are at present the advance of British troops into Afghanistan would be regarded with hostility by the subjects of our ally, the Amir, and that it would be the signal for the rising of the independent tribes who hold the hills between India and Afghanistan. But above all is the question whether the Army of India is fitted, either by its size or its nature, to undertake protracted campaigns at great distances from the present frontier. It is always difficult for men who have been brought up in a school of great tradition to abandon the faith, and among the traditions which have made this splendid Indian Empire have been courage, a belief in the British mission in the East, and undaunted advance. For generations Afghanistan has been a will-o'-the-wisp, and for the purpose of keeping that miserable abode of robbers from extinction, we have spent blood and money and are still spending money with very little return. Few would like to throw up the Afghan policy, yet few are satisfied with it. The abandonment of our relations with the Amir of Kabul would mean the absorption of Afghanistan by Russia. Her railways have reached the Afghan frontiers and she can penetrate more easily than England can. But the policy of sterilizing the glacis does not end with Afghanistan, or Thibet, where the policy was recently applied. We have to consider Persia and Seistan, and later there may be a dangerous glacis to be provided for at the head of the Persian Gulf. Where is it all to end? Nature has indicated a very respectable frontier—our present frontier. No frontier is now impregnable, but with railways and ample supplies, with military works, and an army well fed and unexhausted by marches through hostile country, the existing Indian frontier would serve. While there is no question of the enormous importance of prestige in India, the advance of a European force to the frontiers of India would perhaps not weaken our prestige as much as a protracted and uncertain campaign out in the treacherous mountains of Afghanistan.

Bibliography.—Of the two important sections of the Indian frontier we hear less of the

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Burman borders than we do of the Northwest-ern frontier. India marches with China (Yunnan) on the Northeast, with Siam on the Southeast. For about 100 miles between the point where the Anglo-China boundary ends, and the Anglo-Siamese boundary begins, the British border along the Mekong river touches French Indo-China. The Government of India has relations with the local authorities of these three Governments.

The boundary with China was settled by the conventions of 1894 and 1897 from the Mekong river in the South to latitude 25-40° n., and the greater part has since been demarcated. The Mekong boundary with French Indo-China was settled by the Anglo-French convention of 1896. North of latitude 25-40° we have always claimed that the basins of the Irrawaddy belongs to Burma and that the boundary with China up to the confines of Thibet should be the watershed between the Irrawaddy and the Salween. And this northern part of Burma from the watershed to the borders of Assam is inhabited by wild Kachin tribes, British relations with whom, outside of administrative territory, is managed by the Indian Government through the local government. So also with the semi-independent tribes—Chins and Lushais, who inhabit the hilly tracks between Burma and Assam, and Chittagong. Among works which contain information regarding the frontiers of Burma may be mentioned: John Nisbet, 'Burma Under British Rule and Before'; Shway Yoe (Sir G. Scott), 'Burma as It Was, as It Is, and as It Will Be,' and 'The Burman, His Life and Notions'; Sir Arthur Phayre, 'History of Burma'; A. R. Colquhoun, 'Among the Shans'; E. G. Harmer, 'The Story of Burma' ('Stories of the Empire Series').

The literature on the Northwestern frontier of India is large and increasing. The following books may be consulted: R. I. Bruce, 'The Forward Policy and Its Results'; Valentine Chirol, 'The Middle Eastern Question'; Lord Curzon, 'Russia in Central Asia', 'Persia and the Persian Question', 'The Pamirs and the Sources of the Oxus'; Wm. K. Daly, 'Eight Years Among the Afghans'; Sir Herbert Edwards, 'A Year on the Punjab Frontier'; Dr. Gray, 'My Residence at the Court of the Amir'; Colonel Sir T. Holdich, 'The Indian Border-land'; A. H. Keane, 'Asia'; H. Lansdell, 'Russia in Central Asia'; O. Olafsen, 'Through the Unknown Pamirs'; Sir Henry Rawlinson, 'England and Russia in the East'; F. M. Lord Roberts, 'Forty-One Years in India'; Earl of Ronaldshay, 'Sport and Politics Under an Eastern Sky,' and 'On the Outskirts of Empire in Asia'; M. M. Shoemaker, 'The Heart of the Orient'; F. H. Skrine and E. D. Ross, 'The Heart of Asia'; Sultan Mahomed Khan, 'Laws and Constitution of Afghanistan,' and 'The Life of Abdul Rahman, Amir of Afghanistan'; A. C. Yate, 'England and Russia Face to Face'; C. E. Yate, 'Kurasan and Seistan,' and 'Northern Afghanistan.'

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40. Great Britain—The Free Trade Movement. *Introduction.*—I desire to put shortly before the American people why the British are Free Traders, and why they hold it vital to their interests to maintain Free Trade. Before considering their reasons for favoring such a policy, it is necessary to ask what an Englishman means by Free Trade. He does not, of course, mean that the government ought never to take any toll from traders or lay any taxation whatever upon imported goods. In a modern state it would be absolutely impossible to support any such contention. The enormous revenues which have to be raised to carry on the work of government make indirect taxation an absolute necessity. The principle upon which the British Free Trader insists is that any tariff imposed upon goods entering his country shall be imposed for revenue purposes only. That he holds is the sole object which the Government must entertain in levying its customs. But it follows from this that duties ought not to be levied at the ports on goods produced abroad which are also produced in England. To levy such duties encourages the consumer to buy the home and untaxed goods rather than the foreign and taxed goods, and so diminishes the yield of the tax. Needless to say, this principle is not adopted out of any hostility to home-made products, or from any desire to favor the foreigner. If he thought he could do so without injury to himself, without loss of revenue or without diminishing trade generally, the Englishman would of course prefer that the goods made by his fellow citizens should sell better than those made by foreigners. One of his objections to protective duties (that is, to import duties on articles which are also made at home) is that such duties are not good "drawing" taxes. Unless the State levies excise duties equal in amount to the customs duties, and such excise duties can only be levied profitably in a few instances, the home manufactured goods which escape taxation are, speaking in a strictly fiscal sense, defrauding the revenue. In other words, what ought to go into the public purse is going into the pockets of the protected manufacturers. The more efficiently a tax protects, the worse tax it is for the purpose of filling the treasury—the true purpose of all taxation. It is then, in the opinion of English Free Traders, neither wise nor in the true interests of the State to interfere with the course of trade on any other ground than that of producing revenue.

The Economic Argument.—It must next be explained that the Englishman objects to interference with the course of trade, not out of any pedantic feeling in regard to the abstract "rights" of the trading part of the community, but because he believes that such interference must involve economic waste and so cause material loss to the nation. He believes that to forbid or interfere with exchanges between man and man always results in a diminution of national wealth. The Englishman adopts, and has adopted during the past 50 years and more, the principle that all exchanges are and must be a mutual benefit. They are transactions which are twice blest. They bless him that buys as well as him that sells, and benefit the man who exchanges gold for corn as much as

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the man who gives corn for gold. Hence it has become an essential, nay, an almost instinctive, belief on the part of the great majority of Englishmen that it is to their interest to stimulate and encourage exchanges in every possible way. They hold that to reduce the volume of exchanges must necessarily cause waste. But Government interference with trade by means of customs duties is bound to reduce the number of exchanges. Therefore they will only allow that interference in obedience to the imperative needs of the treasury. They realize that foreign exchanges benefit the individuals of a nation, and so the nation, quite as much as home exchanges, and feel that as long as exchanges are being made freely and are increasing, that there can be nothing wrong, at any rate in the commercial condition of a nation. Only allow free commercial intercourse, free buying and free selling and free access to the ports of a country, and its trade, and so its prosperity, will take care of itself. To allow the maximum of exchanges is to increase the wealth of a nation. To prevent or lessen exchanges is to waste its wealth.

The "Bleeding to Death" Hypothesis.—Further, English Free Traders hold that there is no necessity to be anxious as to whether the imports into a country are greater in value than the exports out of it. They hold that the relations between the imports and exports must necessarily adjust and equalize themselves. Human nature, they contend, has passed an ordinance to the effect that "he that will not buy, neither shall he sell." Thus, instead of fearing that imports, even of goods which can be made in England, will reduce the amount of labor, and so injure home trade, they regard all imports into Britain as orders for British goods to be produced and paid in exchange for those imports. Imports are physical orders for goods, and so for the labor that is employed to make the goods. And they have this advantage: the payment arrives with the order.

At one time the British public, it must be admitted, was not so confident as it is now in regard to the propositions just set forth. The opponents of Free Trade declared that Englishmen were living in a fool's paradise when they supposed that trade could look after itself, and that imports and exports must really be balancing though the statistics *seemed* to show that many millions' worth more goods came into England every year than went out of it. Nobody, they argued, will give something for nothing, and therefore if your imports exceed your exports by, say, a hundred millions a year, you must be paying the difference in some way or other. "There is only one way in which you can be paying it," ran the argument, "and that is by sending away the capital accumulated in years of better trade. In fact you are living on your capital and bleeding to death. Because you have been very rich in the past, the process may take a long time to work out, but some day you will find that you have no more blood left in your veins, and that you have reached the point of economic extinction." That line of argument was first used in the "Fair Trade" agitation in the years 1882-1885, and was revived some three years ago. The simplest answer is found in the fact that if exchanges do not balance and if the British people have been in truth living

on their capital and bleeding to death, they ought by now to be a trebly ruined nation. In the course of the last 25 years imports have *apparently* been so much in excess of exports that the loss in that period must have been nearly £2,000,000,000 of capital. But it is notorious that we have suffered no such loss. Though statistics as regards the accumulation of capital, both in home and foreign investments, are by no means complete or satisfactory, it is manifest that instead of bleeding to death the nation has become more, not less, full blooded from the capitalist point of view and that the total capital, instead of diminishing, has vastly increased in the course of the last quarter of a century. Instead of having £2,000,000,000 less capital, we have many hundreds of millions more and are a very much richer people. In other words, experience has shown that the bleeding to death theory will not bear examination, and that whether on other grounds or not protection may be a good thing, free trade is certainly not driving Britain to bankruptcy or reducing her capital resources. In fact, regarded as a means for increasing and maintaining the material wealth of the nation, Free Trade must be admitted to hold the field.

The Imperial Argument.—Though there is no doubt a great deal of difference of opinion in regard to the best way in which to maintain and develop the British Empire, the nation is virtually unanimous on one point. It is for the benefit—moral, political and economic—of the peoples who compose it that the British Empire shall be maintained. It is asserted on the Protectionist side, however, that the Empire cannot be maintained under a Free Trade system, and that unless that system is changed the Empire will fall. That argument has hitherto not made any impression upon the masses of the British people. Instead of accepting the formula "No Preference, no Empire" they are much more inclined to accept the opposite dictum, "No Free Trade, no Empire" and to hold the opinion that the Empire as it exists to-day is the gift of Free Trade. Up to 60 years ago there was a system of preferential trade within the Empire almost exactly like that which it is now proposed to re-establish. On the one hand the British Colonies were required to give a preference to British manufactured goods and to supply their needs in the British market, and on the other, the British people gave a very large advantage to the products of the various parts of the British Empire in their markets. Yet, strange as it may seem, the result of these attempts to interfere with exchanges on political grounds did not produce a sense of loyalty in the inhabitants of the Colonies or of good feeling toward the scattered parts of the Empire in the United Kingdom. The epoch of Colonial preference was the epoch in which there grew up in England a school of thought and a political party which believed that the connection between the outlying parts of the Empire and the United Kingdom was injurious to both and that it would be to her advantage if Britain got rid of her Colonies and dependencies as rapidly as possible. Even so imperialistic a statesman as Lord Beaconsfield was affected by these views in middle life. He actually described the Colonies as "millstones round our neck" and looked forward to the time

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when they would all be independent. The abolition of Colonial preference and the adoption of the principle of "tariff for revenue only" may be said to have been accomplished by the end of the first half of the 19th century. It was after 1850 and so in the Free Trade epoch that the strong sentiment in regard to the Empire now existing, both in the Colonies and at home grew up. No one now looks forward, as men constantly looked forward during the preferential epoch, to the time when the Colonies would one by one leave the Empire. This being so, many of the most far-seeing and the most steadfast Imperialists in England regard Free Trade as essential to the maintenance of the Empire.

A further argument for Free Trade as an essential condition of empire is to be found in the fact that from the strategic and military point of view the Empire rests upon sea power, and that sea power in the true sense cannot be possessed by a nation which does not also possess supremacy or something approaching supremacy in the matter of its mercantile marine. A great national navy depends upon a great commercial navy. But a commercial navy cannot exist without Free Trade. It is the nations which encourage all who have anything to sell to come freely to their ports and sell it there without let or hindrance, which most easily develop a large mercantile marine. Britain stands first in the world of shipping, not because she has better resources for ship-building, and not because her population is by nature more inclined to sea-faring than others, but because she is a Free Trade nation. Englishmen feel that if they are to keep their empire they must remain a great shipping power, and to be a great shipping power they must maintain Free Trade.

Monopoly and Corruption.—There are two other factors which operate to make Englishmen maintain their present fiscal system. The first is the dread of monopoly which is to be found in the British democracy. They are intensely suspicious of anything in the nature of Trusts or Combines, or of allowing any body of commercial men to be in a position in which they can say "You must either buy the goods we make, or accept the services which we offer, or go without." Dreading intensely the creation of monopolies, they cling to Free Trade, for they realize that it is almost impossible to establish a complete monopoly under their present system. As long as the doors are open, and the traders of every nation in the world are allowed to send what they will to Britain and dispose of it there freely, the task of creating a monopoly in any of the essential needs of mankind is almost impossible of accomplishment. Another reason which weighs not less strongly with the British nation is the dread of political corruption. Rightly or wrongly they believe that there is always a danger under Protection of corruption entering political life. If vast fortunes can be made by the addition of a word or two to the schedule of a tariff bill, they argue that people will take too fierce an interest in politics and that the desire to get those words inserted or to keep them there after insertion will deflect men's minds from what should be their true concern in dealing with public affairs,—

the good of the nation as a whole. Politics, in a word, under Protection, become too personal. The British people do not want any man to find himself in the position of saying "I can't listen to what you say about the interests of the people. All I know is that if the words in the tariff Act which protect the industry in which I work, or in which my money is invested, do not remain in that Act, my wife and children may come to starvation. Therefore I mean to work with anybody or any party which will give me the assurance that my livelihood shall not be placed in danger. I am a man and the father of a family first of all." It must not be inferred that the British people consider that a proper regard for national interests can never be found in protectionist states. The history of America shows that in spite of the dangers to which I have alluded, plenty of unselfish patriotism is to be found in countries where protection prevails. The fact, however, remains that the British people do dread very greatly the introduction of protectionist conditions into their political life. Further, they dread the direct corruption of the Legislature by the great commercial interests. They may trust their Members of Parliament in the abstract but they do not wish to see them exposed to the temptations which unquestionably exist when enormous pecuniary interests depend upon the maintenance of a Protectionist tariff. If once a Legislature becomes corrupt, the chief safeguards of liberty are destroyed. Hence, the British democracy feel that with the maintenance of Free Trade is bound up a great deal of what they value most in the political system under which they live. See GREAT BRITAIN—THE BRITISH TARIFF MOVEMENT.

General Conclusions.—To sum up, the British people have established the policy of Free Trade and wish to maintain it on the following grounds: (1) They believe that the abandonment of Free Trade would cause economic waste and so tend to national impoverishment. (2) They believe that Free Trade secures the Empire of which they are so proud, and also gives them that naval strength upon which in the last resort that Empire rests. (3) They believe that Free Trade prevents the growth and spread of political corruption,—the chief danger of modern democracies.

Bibliography.—The main outlines of the early free trade movement can be found in general histories, such as 'The growth of English Industry and Commerce,' vol. II, by W. Cunningham; 'History of British Commerce,' by Leon Levi. But the real relation of the movement to English life and progress is best seen in the speeches of the politicians mainly responsible for the carrying out of ideas into practice. There is ample material of this kind in the 'Speeches' of W. Huskisson (1831); of Sir Robert Peel (1853); in the 'Free Trade Speeches' of Charles Villiers (1883); in the 'Life and Speeches of John Bright,' by G. B. Smith (1881); and in the 'Life of Richard Cobden,' by J. Morley (1881); the 'History of the Anti-Corn-Law League,' by H. Prentice (1853), and the 'History of the Free Trade Movement in England,' by A. Mongredien, also contain much information as to the earlier period.

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The revival of interest in the question in the early eighties, the controversy as to the results of English policy and the influence of the example of foreign countries, are illustrated in 'Free Trade and Protection,' by H. Fawcett (1878); and 'Free Trade v. Fair Trade,' by Sir T. Farrer (1885); 'The Free Trade Movement and its Results,' by G. Armitage-Smith (1903); 'Elements of the Fiscal Problem,' by L. G. Chiozza Morey (1903); 'The Tariff Problem,' by W. J. Ashley (1903); 'The Rise and Decline of the Free Trade Movement,' by W. Cunningham (1903); 'The Return to Protection,' by W. Smart (1903); represent from various points of view, the reviewed controversy of the present day. An interesting general view by a disinterested observer is given in C. J. Fachs' 'The Trade Policy of Great Britain and her Colonies,' translated by H. M. Archibald (1905).

JOHN ST. LOE STRACHEY,
Editor of 'The Spectator.'

41. Great Britain—The British Tariff Movement: Its Origin, Theory and Prospects. "For more penetrating observers," writes Dr. Schulze-Galvernitz in the latest and ablest study of the British economic situation, "the overwhelming success of the Liberals in the elections of January 1906, was less surprising than the number of votes given against Free Trade." This is the verdict of the searching and candid writer whose prepossessions are all in favor of Free Trade. The remark shows a genuine anatomical knowledge of British politics and may be commended to Americans who wish to penetrate surface impressions on this subject and desire to grasp the underlying facts. My purpose, so far as the brief space permits, is to state the facts, to explain their causes, and to indicate what seems to be their tendency.

The main fact is that England has ceased to be a solidly Free Trade nation, though possessing at the present moment a Free Trade majority of an insecure character. The state of Parliamentary representation does not truly reflect the balance of national opinion. In England and in the United States a small majority of the nation may secure a disproportionate power in the Legislature. Any party which could obtain a one per cent plurality everywhere would obtain an absolute monopoly of representation, although it had secured only a little more than half the votes. Thus, as a result of the recent General Election, the Unionists, or Fiscal Reformers, were reduced in the House of Commons to an unprecedented minority. In Great Britain they secured less than a quarter of the seats; but the important point is that they obtained nearly 44 per cent of the National vote. The balance of opinion disclosed at the polls may be shown in round numbers as follows:

BRITISH NATIONAL VOTING JANUARY, 1906.

	Per cent.
For Liberals (Free Traders).....	2,600,000, or 48.2
For Unionists (Fiscal Reformers)....	2,350,000, or 43.5
For Labor Party (Independents).....	450,000, or 8.3

5,400,000

(1) The Labor party is chiefly a Socialist party, though for reasons of policy it declines

that title. It is independent in its parliamentary position and independent in its economic opinions. Its support of Free Trade is tactical, perhaps temporary. It assures the masses that Free Trade alone is a failure; that the tariff alone is no remedy; that both are unimportant by comparison with the policy of Socialism; that either may be used to promote Socialist purposes. The truth is, that in a period of trade depression the tariff movement would try to capture the Labor party while the Labor party would try to capture the tariff movement. In any case independent labor is not a fixed Free Trade force; and this being so, a glance at the figures just given will show that Great Britain no longer possesses anything like a fixed Free Trade majority.

(2) The aggregate Liberal vote was less than 50 per cent of the whole, though the pendulum was swinging with very exceptional violence against the late Government for reasons largely unconnected with the Free Trade issue.

(3) The Unionist, or fiscal reform party, secured at the first trial of strength, within less than three years from the beginning of Mr. Chamberlain's tariff campaign, the support of more than two-fifths of the nation. This is the surprising fact, as Professor Schulze-Galvernitz perceives. Seventy years after Adam Smith's 'Wealth of Nations' had appeared; nearly a quarter of a century after Huskinson had commenced to reduce the obsolete tariffs raised to an exorbitant height by the desperate revenue necessities of the Napoleonic wars; seven years after Cobden had started his violent and masterly agitation against the corn duties, the country was still unconverted to the Free Trade principle. It was suddenly moved to throw open its ports by the Irish famine and the crop failure of a disastrous season. "It was the rain," as Mr. John Morley remarks, "that rained away the Corn Laws in 1846."

By these comparisons the rapidity and extent of the progress made by the new movement in Great Britain are to be measured. We have a strong Free Trade party which is at present in power. We have ceased to be a Free Trade nation. That policy formerly depended upon unanimous national support. It now depends upon the odd man. Holding the casting vote under the party system, the odd man is no doubt omnipotent while he remains of the same mind. But he determines the rise and fall of Governments by changing his mind.

The predominant fact, then, of present English politics is the rise of the tariff movement. The history of this fact may be briefly sketched. Its origins were slow and subconscious. Mr. Cobden had always dwelt upon the advantage of an unfettered exchange of cotton for corn. England would manufacture the cotton and other things; America and other countries would grow the corn; there would be an ideal division of labor from the British point of view. Mr. Cobden promised that if England abolished her tariffs there would not be a country in the world within five years but would have followed her example. Sixty years have elapsed; no country has followed her example. A steady rise of national tariffs, as elaborate and powerful as the fortifi-

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tations of Vauban, has dominated the intervening period. The Far East is about to repeat the example of the United States and the European Continent. Great Britain is only one open island amid the closing markets of the world. Free Trade, therefore,—exchange equally unrestricted on one side and the other as between two nations transacting—has never yet prevailed anywhere. It is an unknown condition. Even England has not had it. She has instead the system of free imports by which foreign competition is admitted without interference to her market, while her own competition is as far as possible suppressed in foreign markets. That is not a satisfactory comparison.

Foreign protective tariffs are a disadvantage to British trade. British free imports are relatively an advantage to foreign trade. The conditions are unequal. Unequal conditions in commerce are not good. Free Trade writers cannot be induced to examine the practical effect of the inequality—pivot-point nevertheless of the British economic controversy. They simply restate, without modification of any kind, the traditional arguments which would apply to a genuine international system of free exchange, but cannot apply in the same measure—and, to a large extent, do not apply at all—to the state of things prevailing in the total absence of that system.

For a prolonged period (1846-1875), British trade expanded with unexampled energy. Agriculture flourished. The economic conditions of the world were transformed by the Californian and Australian gold discoveries; by railway construction in the United States and upon the European Continent; by steam shipping. But America and Europe alike were convulsed by great wars. Their state systems were refunded. Their tariffs were readjusted in the spirit of Alexander Hamilton rather than of Adam Smith. They were equipped with railways and prepared for manufacture. England had remained at peace and her workshops dominated all markets. But her memorable period of uncontested supremacy was over.

In 1878—exactly a generation after Mr. Cobden's triumph—a period of commercial depression reached its depth. Crowds of industrial workers were unemployed in the cities. The old prosperity of British agriculture was broken and the rural population began rapidly to diminish. From that moment through another quarter of a century of trade fluctuations, the truth of the free import theory was questioned by an increasing number of English thinkers. Popular distrust, however, preceded scientific opposition. The "National Fair Trade League" was started in July 1881, and carried on for more than a decade a formidable political agitation, stimulated by some able controversial literature and a vigorous weekly paper. This protectionist movement, however, failed to find a great leader and died out in the early nineties. Its only chance of success lay in converting one of the great political parties. The Conservative rank and file were generally predisposed to protection. The Conservative leaders patronized the Fair Trade movement while the Liberals were in power,

and stifled it when they had obtained office themselves. Nevertheless, other influences continued, almost imperceptibly to dissolve Free Trade conviction throughout the country. The British 'Trade Consular Reports' became a serial narrative of the advance of protectionist competition, American and German, in markets where British manufactured exports had recently been supreme. The immense progress of the United States and the new German empire showed at last that free imports, or half-free trade, was not a certain recipe, assuredly not the sole recipe, for commercial success, and that protection was not necessarily a prevention of progress. There was a general mood of profound anxiety as to the position and prospects of British commerce, and a widespread scepticism as to the theoretical truth of Free Trade and the practical advantage of free imports.

All the previous scepticism and mistrust which had existed upon the question of Free Trade were crystallized in 1903 when Mr. Chamberlain created the new fiscal reform movement. His Birmingham speech on May 15 in that year was one of the dominating events of English politics. In the limits of this article it is impossible to trace the history of his agitation. The result has been noticed. There has been a small schism of very distinguished persons. There is some difference between Mr. Chamberlain and Mr. Balfour as to the sort of commercial system to be substituted for the existing one. But the Unionist (or "Conservative" or "Imperialist") party is committed to some form of tariff policy. The Liberal-Irish Nationalist-Independent Labor Coalition which conquered at the last General Election is not morally solid against the tariff. The present writer believes that Mr. Chamberlain's policy is the policy of the future. England, let us repeat the fact, has ceased as a whole to be a Free Trade nation though still containing a great free trade party whose parliamentary predominance rests upon a comparatively slight majority of popular votes.

We now pass from the history to the theory of the movement. Free Traders say: (a) *that tariffs restrict trade*. The reply is that exports and imports alike are increasing in every considerable protectionist country. Germany's break with the Cobdenite system in 1879—America's adoption of what Englishmen call McKinleyism—have been followed not by commercial restriction, but by a greater expansion of production, foreign exchanges, employment, population, and wealth than has taken place in Great Britain during the parallel period. No Free Trade writers grapple with the fact—few ever notice the fact—that the fundamental principle of a scientific tariff is the free importation of raw material, side by side with the taxation of foreign competitive manufacture. The tariff idea aims at restricting the least advantageous kind of imports in order to develop the most profitable kind. So far from implying restricted trade, it means, when competently adjusted, the largest volume of the best exchanges.

(b) *That imports must be balanced by exports—that goods received must be paid for by goods returned—and that as all inter-*

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national exchange will arrange itself in an ideal manner, if you let it alone, the State ought not to interfere with it. The reply to these statements is that they are to a large extent altogether inaccurate, and for the rest are superficial half-truths of a singularly deceptive character. Imports may or may not be completely paid for by exports (including shipping freights and foreign investments). The account may be cancelled by the transfer of securities. An excess of imports may remain as invested capital, the interest only being returned, and the complete "balancing" being indefinitely deferred. England, for instance, formerly sent a steady excess of imports into the United States. The excess remained for the most part as British capital invested in America. America ceasing to be a debtor nation has cancelled a good deal of that British capital by the excess of her own exports in recent years. Thus while imports and exports may appear to balance more or less all the time, according to the conventional Free Trade theory, a movement may be gradually going on under the surface which actually reverses the position of the two countries concerned; and transfers the commanding advantage of economic relations from one country to another. Again, no Free Trader asserts that like is paid for by like—that the import of foreign *manufacture* produces an equivalent export of home *manufacture*. A country which formerly exported raw produce in exchange for finished manufacture may rise in the social scale and export in its turn finished goods to pay for crude material. So far as the maxim tells upon the practical controversy, it tells both ways. Imports and exports do not balance better under free imports than under the tariff. America pays for her imports with her exports and has a probable margin to spare! America entrenches her own trade in its position and makes it as difficult as possible for foreign competition to displace it. The English system makes it as easy as possible for foreign manufacture to displace home industry. Under Free Trade the products of certain industries may pay for the competitive imports which are steadily weakening other industries. To sum up, the tendency of isolated free imports is to undermine the national defensive position in trade after trade. America and Germany under the tariff are making new conquests in trade after trade. "Where organization becomes necessary," said Brunel, "*laissez faire* becomes impossible."

The British tariff movement, however, lays more stress upon its constructive principles than upon its replies to the sophistry of Cobdenite syllogisms. It is maintained that the tariff under British conditions would mean the maximum increase and the best distribution of wealth. An isolated free import system implies the narrowest and least secure market. A competitive import only enters by displacing the home supply against which it had competed. There is a gain to some home consumers but a loss to some producers. The nominally counterbalancing export follows at the second remove, though meanwhile a net injury to the productive power of the importing country may have been inflicted. Home

capital may have been sterilized; home labor displaced. How different under the American or German national systems. There, imports are mainly non-competitive; they must either stimulate home production or supplement it. The possibility of loss at this first stage is reduced to a minimum; the return export follows in the ordinary course, and benefit accrues at each stage of the transaction. The percentage of unemployed persons (skilled artisans and laborers) is considerably greater in England than in the United States or Germany. For in the former case the Cobdenite system facilitates slow but steady displacement of home labor and arrests the development of all trades against which foreign finished goods compete. Again, under the present conditions free imports actually restrict British industry to the smallest market and secure foreign competition in the possession of the largest market. America has free sale within her own market and ours, among 125,000,000 of people; Germany has free sale in her own territory and equally in the United Kingdom—a similar double-market of over 100,000,000 of people. England has no free sale for her goods outside her own home market of 40,000,000 of inhabitants, and does not reserve any advantage to herself even upon her own soil. The conditions are not equal; the inequality means a steady discount upon British national prosperity.

The argument may be reviewed succinctly. For the island and the empire fiscal *laissez faire* is now a principle of *minimum* development. We must seek in another policy the principle of *maximum* development. The principle of maximum development in economics demands the maximum efficiency of capital. In every country which admits the raw material of industry free, but discriminates against foreign finished goods, the activity of capital is more decisively encouraged than under Cobdenite conditions, where the British manufacturer is excluded by foreign tariffs abroad, and attacked at his own home base by protected competition. Cobdenism gives away the whole case when it declares that capital under the tariff is stimulated. We are told, it is true, that the stimulus is secured by pillaging the consumer. That is rather demagogically stated than commercially reasoned. For if capital is stimulated at all, its operations must be extended; its efforts in developing the productive capacity of a country must be more powerful; it must create the maximum amount of employment; it must tend to raise wages by the most certain of all methods—that of increasing the demand for labor; and it is not possible, if the chain of reasoning be sound, that the consumer can lose in the long run by the policy of maximum development.

Finally, there is a moral question rather unpleasantly introduced in a manner which can only be called a little insular. It is said that the tariff would introduce corruption. I do not believe it. In economic controversy it is especially desirable to "clear our minds of cant." In spite of free imports, gross frauds are perpetrated in English finance and a considerable amount of petty dishonesty prevails in business. Human nature is tinctured in the

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ordinary way, and to revive the old pose of superior virtue is a proceeding which appears to be a little deficient in humor. Corruption in America, if I judge aright, is due to the concentrated passion of the money-hunt, to the vehemence of the desire to succeed, and the sheer difficulty of bringing public opinion steadily to bear upon any one aspect of this evil amid a heterogeneous society in a state of violent material development. Corruption rages in every phase of expansion and exploitation. It will be eliminated as the conditions of American society become more settled. Where it prevails it is apt to taint everything. It will taint the tariff if it touches the tariff; but nothing could be more unhistorical or less imaginative than to represent whatever commercial and political corruption there is in America as due to the national economic policy founded under Alexander Hamilton and restored under Lincoln. For the rest the American habit of making public confession under a sounding board creates an exaggerated impression in Europe where the admitted evil is popularly believed to be far worse than it is. Shipping and revenue will be more properly dealt with in another section. The aim here has been to show that the tariff movement in England depends upon a theory of development, not of restriction; that the political prospects of that movement are good; and that the real strength of the foundation of the free-import system, national unanimity in support of it, has irrevocably disappeared.

See GREAT BRITAIN—FREE TRADE; PROTECTION.

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42. Great Britain—Reaction of British Imperialism Upon the Mother Country. The maintenance of the British Empire is not merely the great problem of the King's dominions as a whole. It is the vital problem of British domestic politics. We shall proceed to regard it under this latter aspect. What the shores of the Baltic were after the fall of Rome, the United Kingdom has been in the last few centuries—a nursery of nations. The area under the flag is about 12,000,000 square miles, or not much less than a quarter of the earth's land surface. Two-thirds of this area consists of territory more or less suitable for white settlement and more or less occupied by white races. These are the "Colonies." The other third includes India, always to be regarded as a world within a world, and the undeveloped tropical possessions. These

are the "dependencies." The dependencies present a strict *Imperial* problem. The colonies, on the other hand, present a *Federal* problem. That distinction should be clearly grasped and borne always in mind. These two very different sets of facts have exerted a double and parallel reaction upon insular conditions, mental, moral and material. Great Britain cannot continue to exist as a great power unless she can induce the colonies to enter with her into a political or a commercial partnership; or into a Defence Union and a Customs Union combined, such as the thirteen colonies formed when they adopted the American constitution and became the United States. It is improbable, however, that the British dominion can be consolidated and preserved unless the mother country resorts to an extensive reorganization of her traditional arrangements.

The growth of what is called the Imperial idea in British politics may be rapidly sketched. After the American War of Independence the credit of the old Colonial theories was destroyed in Europe. "Colonies are fruits that cling till they ripen," said Turgot. That a country should facilitate the emigration of vigorous citizens, extend its responsibilities and increase its burthens, in order to create new States certain (as it was thought) to separate when they were strong enough, seemed a proposition of which the folly had been demonstrated once for all at Yorktown. This feeling was naturally most intense in England and continued well nigh unchanged for nearly three generations. By the complete conquest of India trade was increased; national imagination was stimulated; the adventurous and administrative vigor of the race was kept in play. But India remained remote and alien. The English people had no ideal sense of connection with it, although the conviction that mercantile supremacy depended upon the possession of it was widely spread.

The victorious sequel of the struggle against Napoleon was a triumph of the national power contained within the four seas of the British islands. In spite of the loss of the thirteen colonies, England seemed stronger than ever, and toward the close of that era had occurred the war of 1812. After Waterloo, Englishmen with leisure to reflect upon the tremendous vicissitudes of events in the previous half century, felt not unnaturally that colonial enterprise meant a loss of national force and created new perils. This mood deepened throughout the years of the Great Peace. It was now clearly expressed by the father of the free-import system—Mr. Cobden. To him the separation of America seemed not only a necessary political experiment in itself, but a precedent which not only would be, but ought to be repeated in the future. Trade with the United States had much increased and there was no longer any obligation to defend them. That seemed to be an ideal result. Canada, Australia and South Africa were vast wildernesses, supporting little commerce at that time but aggravating military charges. There was a preference under the old protectionist tariffs for West Indian sugar and Canadian corn and timber. The higher duties upon the corresponding foreign products were represented as having been imposed in order to favor the

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colonies (though it may be doubted whether any duties would have been lower had the colonies not existed) and this was represented as another artificial burden laid upon the consumer. Cobden thought the colonies were useless and dangerous possessions. He thought India was an immoral possession, and that matters would never be well with England until she stripped herself of all these appendages and returned to a strict national basis. His belief is summed up in the well known letter of 1842:

"The colonial system with all its dazzling appeals to the passions of the people could never be got rid of except by the indirect process of Free Trade which will gradually and imperceptibly loosen the bonds which unite the colonies to us."

As to the whole spirit of British history:

"Unlike every other people, we have during seven centuries been fighting everywhere except upon our own soil. Need another word be said to prove us the most aggressive race under the sun?"

In India the position was iniquitous and the prospect hopeless:

"There is no future but trouble and loss and disappointment and I fear crime in India; and they are doing this country the greatest service who tell them the honest truth according to their convictions and prepare them for abandoning at some future time the thankless and impossible task."

Upon the project of Canadian Confederation Mr. Cobden expressed his views with his accustomed plainness and vigor:

"In my opinion it is for the interest of both that we shall as speedily as possible sever the political thread by which we have been connected. I have felt an interest in this Confederation scheme because I thought it was a step in the direction of an amicable separation."

Cobden's opinions were shared in essence even by the majority of the cultivated and aristocratic classes who disliked his unvarnished language. The extracts given illustrate the mood which prevailed almost universally until late in the sixties of the 19th century.

Then the tide began to turn. The reaction was deeply connected with the events of contemporary history and the change in the spirit of international politics. Since the American and French revolutions the ideas of liberty and independence had dominated and inspired men's minds. Henceforth, the idea of *unity* was to direct politics and to penetrate into the sphere of commerce. Italy reconquered her unity after the disintegration and enslavement of centuries. American unity was vindicated in the mighty grapple of the Civil War. The imperial unity of the German race was magnificently restored. Under the British flag the Canadian Confederation, like the Australian Commonwealth later, had been born in peace. Steam had diminished all distances and the unity of the British dominions had become for the first time a physical possibility, bound to become more and more feasible as the rapidity of modern communication developed. But above all, Lincoln's and Bismark's victories (with intent we name statesmen rather than soldiers) had caused people in Great Britain to reflect that the American power and the German power of the future would dwarf Great Britain in the end, politically and commercially, unless the zone of a Britannic Federation could be made to span the world. Australia after the gold discoveries promised to fill up more rapidly than it

has done. Russia was now drawing nearer to the Indian frontier; England began to realize that the result of bleeding to death at the extremities might be the same as a thrust in the heart. Imaginations awakened under the apprehension of future necessity. Queen Victoria was proclaimed Empress of India by the policy of Lord Beaconsfield, who knew that democracy only understands the simple and grandiose forms of symbolism. The Prince of Wales (now King Edward) visited India, and his tour, followed with intense interest at home, became a popular education. Next South Africa was the scene of fierce and exciting little wars. Professor Seeley's brilliant little study 'The Expansion of England' had, it is not too much to say, a greater influence upon British political thought than any other book of the same size published in the last two generations. Lord Cromer's masterly administration of Egypt followed and was rightly regarded as a great moral vindication of the history and genius of Imperial Britain. Cobden's view of the ethical aspects of Imperialism was replaced by the opinion best expressed in the late Professor Pearson's 'National Life and Character,' "In India for one war that we have waged we have prevented twenty." Mr. Gladstone's Home Rule policy was regarded as a policy of disruption. Hence his defeat. The Conservative-Liberal coalition which overthrew him and formed the Unionist party emphasized the idea of National and Imperial unity through the 20 years of its almost unbroken rule (1886-1892 and 1895-1906).

All these influences were gathered to a focus in the Jubilees of 1887 and 1897—memorable celebrations of the fiftieth and sixtieth years of Queen Victoria's reign. Mr. Chamberlain as Colonial Secretary was the strongest and most conspicuous personality in the Ministry. Then came the crucial test of the recent South African War. It was felt that the fate of South Africa and the ultimate existence of the Empire depended upon the issue. When the mother country and the colonies marched together the war was fought as a war for unity. The movement of national sentiment in favor of Imperialism appeared decisive; the ideal remained vague.

In 1903 Mr. Chamberlain resolved to attempt the first constructive steps, by proposing a closer union with the colonies upon a commercial basis. He had hoped in the first instance to create a central Imperial Council to organize Imperial defence. The colonies perceived that representation with that object would ultimately mean taxation for it. For this they were not prepared. But they offered to conclude treaties admitting British goods to their markets upon preferential terms. Canada had already made a beginning in that direction. Other colonies have followed. But the reciprocal condition necessary to a powerful extension of the system has not yet been given—a corresponding preference in the British market for colonial produce.

This would necessitate the introduction of a British tariff. The more the problem was examined the more deeply Mr. Chamberlain became convinced that it must be attacked upon the commercial side, if progress toward its solution was to be made. There we should follow the American precedent and the German precedent. "The Constitution" said Daniel

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Webster, "was the child of pressing commercial necessity." And of the resolution upon which the Philadelphia Convention was called the same orator says: "Look at the resolution itself. There is not an idea in it but trade. Commerce, commerce is the beginning and end of it." The North German Zollverein preceded German political unity. It seems fairly clear in the British case that some form of Imperial Zollverein must be established before any form of Imperial Kriegsverein can be created. But Mr. Chamberlain was met, both in his own and the opposite camp, by the contention that the traditional policy of free trade forbade any attempt to enter into preferential commercial relations with the colonies. Mr. Chamberlain then decided that the traditional policy of free trade must go. But it was mainly for political reasons that he assailed the theory of Cobdenism upon the field of national production as well as in the sphere of Imperial trade. A British national tariff upon foreign manufacture would assuredly accompany a system of preferential commercial treaties with the colonies; and this would be an extraordinary result of Imperial influence working back upon insular organization.

The immediate effect of Mr. Chamberlain's agitation has been to give a wholly new direction to a great body of national thought. To repeat here words that the writer has previously used, the security of the King's dominions would be best based upon the power of a white population proportionate in number, vigor and cohesion to the vast territories which the British democracies in the mother country and the colonies control. That surest of all guarantees is obviously lacking to British power. Although we have a quarter of the world under our flag, we are much less numerous than Americans or Germans. We cannot safely believe that we are more efficient. We are not. The home populations of the three great countries chiefly concerned in the future of trade and seapower compare as follows: United States 84,000,000 of people; Germany 61,000,000; and the United Kingdom 43,000,000. So much for the present. What of the future? The Kaiser's subjects increase twice as fast as King Edward's subjects in the mother country. The white population under the American flag increases three times as fast as the white population under ours. By 1920 the United States ought to count considerably more than 100,000,000 of people. The German Empire within its present limits should count 75,000,000. The United Kingdom at the present rate of increase (and that rate slackens rather than accelerates) would number in 1920 only about 48,000,000 of people. The British nation cannot limit its view of economic policy by the insular horizon. Were we compelled once more to lead an isolated life we should realize the disadvantages of being an island,—and a small one!—Nature has fixed our bounds. We have no *hinterland*. Railways through Europe and direct shipping services are diminishing our importance to the nearest continent as a warehousing centre and place of transshipment. Were Europe involved in a great war from any cause whatever, a perfectly possible reconstruction might create a pan-German empire with a population as large as that of the United States,

stretching from the North Sea to the Mediterranean and perhaps across the Bosphorus (for the Turkish dominions even if remaining unconquered might very well be drawn into a Central European Zollverein) and occupying a political and strategical position unrivalled in the world. Such a development of European politics is no less and no more possible than the events from 1864 to 1871 which led to the hegemony of Prussia in the restored German Empire. Upon the other hand the British self-governing colonies taken together have an area more than twice as large as the United States—but they contain a white population estimated at 11,000,000, or very considerably less than the population of New York State and Pennsylvania taken together. If England desires a more rapid increase of white population in her colonies, she must take some special steps to promote that result. Otherwise even a complete federation with her daughter-states would not enable her to maintain her present relative political and commercial power or to guarantee their safety.

Unless Great Britain can fill up her colonies and form a union with them, her prospects of maintaining the command of the sea by the use of her insular resources will become hopeless. Maritime supremacy, and with it her present imperial and commercial position, would pass away perhaps before the end of another generation under conditions of peace and through the natural operation of economic and social forces. Take the comparison with Germany alone. For armaments and interest on debt, the United Kingdom pays nearly £90,000,000 annually. Germany pays less than £50,000,000 upon the same accounts. The reason is that her national debt is exceedingly small by comparison with England's; her vaster national army is no more expensive; her navy at present no more than one third, at the most, in size and cost. Yes; but look at the figures just given and you will observe the fact that Germany could ultimately maintain a fleet as large as the British while paying less than the United Kingdom pays now for the triple financial services—National Debt, Army and Navy. It is tolerably plain then that the only hope for the island, from a revenue point of view, lies in union and development of the Empire. This view has been authoritatively expressed by Sir Michael Hicks-Beach and Lord St. Aldwyn. He was chancellor of the Exchequer during the South African War, is a firm opponent of Mr. Chamberlain's commercial plans and advocates the impracticable alternative of large direct colonial contributions to the support of the British Navy. In heading a deputation upon this subject to the Prime Minister Sir Michael Hicks-Beach spoke as follows on 10 Dec. 1904:

"It is my deliberate conviction, looking at the enormous efforts now being made in all parts of the world by great powers in increasing their naval strength, that without recourse to a system of borrowing for current expenditure, which would be deeply injurious to the credit of this country, and which would deprive us of the resources necessary for carrying on any great war—without such recourse it would be impossible for taxpayers of the United Kingdom to continue to bear alone the vast and ever increasing burdens of the naval defence of the Empire."

It is often said that a tariff which protects shuts out the goods and produces no revenue; and that a tariff to produce revenue must let in

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the goods and cannot protect. This is a purely verbal difficulty. Every well-adjusted tariff is partly a protective and partly a revenue-producing instrument. It serves both ends in sufficient measure while serving neither exclusively. Free Traders point to the fact that Great Britain still possesses half the mercantile shipping tonnage of the world, as though in that fact rested naval security and a decisive argument against change. England's advantage in the carrying trade is no larger than it was a generation ago in the iron trade. Americans and Germans were only beginning to compete in iron then, and both have beaten English iron; they are only beginning to compete in shipping now. But sea-power has become a highly specialized form of force, far less intimately connected than in Nelson's days with the mercantile marine, and depending more generally upon the whole financial and technical resources of the nation behind it. Great Britain has half the merchant shipping of the world. In that respect, she has reached the maximum, and the percentage is beginning to show a slight but unmistakable tendency to recede. Under protection her chief commercial competitors have developed a financial and taxable capacity which enables Germany and the United States for the first time to challenge British naval supremacy in earnest. It is perfectly conceivable that England might retain her present proportion of the world's mercantile tonnage and might nevertheless lose her naval supremacy through the eventual ability of some power to bear a far larger naval budget than England as an island could afford.

The United States could dispense in a crisis with the whole of its foreign trade. Germany beaten at sea would still produce the great bulk of her food supplies upon her own territory. France, with her wonderfully compact economy, is practically self-contained. But England is more dependent upon exterior forces for her means of existence — her agricultural imports and her raw material; the food for her people and the food for her machines — than any other society history has known. Great Britain, in other words, cannot continue to be a great power upon an insular basis and the failure to unite her Empire would be followed by the decay of her present national status. The fate of Holland is her danger. The application of the spirit of the Philadelphia Convention to the circumstances of her vast and heterogeneous dominion — that is her hope.

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GREAT CIRCLE SAILING—GREAT FISH RIVER

Great Circle Sailing. An astronomical phrase meaning a circle the center of which coincides with the center of the sphere. Thus, the equator, the meridian, and the ecliptic circles are such "great circles" on the globe. Between any two points on the surface of a sphere the shortest distance lies along the arc of a great circle which passes through those two places. Such a great circle cuts the successive meridians at different angles whenever the two places are not on the equator or on different meridians. The point of the curve nearest the pole is called the "vertex," the point most remote from the thumb line is designated as the "point of maximum separation." "Great circle sailing" is merely a method of navigating vessels by the arc of a great circle. This method was first mentioned by one John Davis (1594) in a book called 'Seaman's Secrets.' It was much elucidated subsequently — by Townson (1847), by Godfrey (1858), by Captain Bergen (1880), by Goodwin (1894), and by Captain Lecky (1903). The great circle course, as followed by mariners, is that on which a vessel sails straight for her distant port, which she would follow if heading for a heavenly body directly overhead. That this heavenly body is only imaginary does not in the least rob the method of practicability. Of course difficulties of computation in great circle sailing are numerous, but the invention of several ingenious devices have greatly minimized these difficulties. Charts are prepared on what is known as the gnomonic projection, and the use is made of great circle protractors, the sphereograph and other instruments. The gnomonic chart is made by the projection of the earth's surface upon a plane, tangent to the earth at some point on its surface, taking as the point of sight the center of the earth. By this construction, all planes cutting great circles on the earth, pass through its center and cut the plane of projection in straight lines, so that a straight line joining any two points on the chart will be the projected arc of the great circle. Charts have been constructed in this way by the hydrographic office of the U. S. Navy Department, and greatly facilitate the work of the navigator.

Great-crested Flycatcher, a large flycatcher (*Myiarchus crinitus*), which is a summer visitor to all parts of temperate North America, and is noted for its shrill, yet musical scream, and for its habit of entwining one or more cast-off snake-skins in its large tree-lodged nest. It is olive-brown above, with an ashy head surmounted by a tall brownish crest, and the lower parts delicate yellow. Several other species belong to the southwestern States and Mexico, and are often called crested kingbirds.

Great Dane, a breed of large, smooth-coated dogs, the modern equivalent of the ancient boar-hound. See Dog.

Great Divide, The. See DIVIDE, THE GREAT.

Great Eastern, a British iron steamship, before the Celtic the largest vessel constructed, built (1854-8) at Milwall, on the Thames, for the Eastern Steam Navigation Company, by Scott Russell, from plans by I. K. Brunel; length 680 feet; breadth, 82½, or, including paddle-boxes, 118 feet; height, 58 feet (70 to top of bulwarks). She had 6 masts, 5 of iron and 1 of wood, and could spread 7,000 yards of sail,

besides having 8 engines, divided between her screws and paddles, and capable of working at 11,000 horse-power. From the first her career was unfortunate, the launching process alone lasting three months and costing \$300,000. After several unremunerative trips to New York she was employed first as a troop-ship, and then as a cable-laying ship, for which her size and steadiness specially qualified her. Various attempts were afterward made to utilize her, but she at last came to be a mere holiday spectacle, and was broken up in 1888.

Great Expectations, a novel by Charles Dickens, published in 1861. As in 'David Copperfield,' the hero tells his own story from boyhood. Owing to the simplicity of the plot, and to the small number of characters, it possesses great unity of design. These characters, each drawn with marvelous distinctness of outline, are subordinated throughout to the central personage "Pip," whose great expectations form the pivot of the narrative.

Great Falls, Mont., city, county seat of Cascade County; on the Missouri River, the Great Northern, and the G. F. C. Railways; 120 miles northeast of Butte. South and nearby is a great mining region and north is an agricultural and grazing section. It has large gold, silver, and copper smelters, and bituminous coal, lead, iron, and sandstone are found in the vicinity. The excellent water power which the city possesses is an inducement to manufacturers to establish works in Great Falls. The water-power, at medium low water, is equal to over 350,000 horse-power, and this, together with the unusual wealth of minerals, has largely aided the rapid growth of the city. There are a number of falls here; one, Great Falls, gives name to the city. Its rapid growth has been largely the result of its natural resources. Its chief manufactures are flour, furniture, mining and agricultural instruments, wagons, carriages, and woollen goods. The first settlement was made in 1884, and in 1888 Great Falls was incorporated. Municipal affairs are administered by a mayor, elected biennially, and a city council of two chambers. Minor officials are nominated by the executive and confirmed by the council. The water-works are owned and operated by the city. The population increased from (1890), 3,979 to (1910) 13,948.

Great Fish, or Black River, a river in Mackenzie and Keewatin territories, Dominion of Canada. It rises in a small lake near the northern shore of Lake Aylmer, flows in a northeasterly direction through lakes Beechy, Pelley and Garry, and enters the Arctic Ocean by a wide estuary. King William Land is near its mouth. The Great Fish River is about 500 miles in length. Sir George Back, the Arctic explorer (1796-1878) explored the river in 1834-5 and followed it to the ocean. He described Ah-hel-Dessy, or Parry Falls, on one of the tributaries, as more grand than Niagara in splendor of effect. See Back 'Narrative of the Arctic Land Expedition to the Mouth of the Great Fish River' (1833-5).

Great Fish River, a river in Cape Colony, South Africa, which rises in the Sneeuwberg, or Snowy Mountains, and after a southeasterly course of 230 miles, enters the Indian Ocean at lat. 33° 25' 5", and long. 27° 8', about five miles northeast of Port Alfred.

GREAT HORNED OWL — GREAT MEADOWS

Great Horned Owl. See EAGLE OWL.

Great Island. (1) A small island at the entrance to Portsmouth Harbor, N. H. It has a lighthouse 90 feet high. (2) An island in Bass Strait, between Tasmania and Australia. It is about 40 miles long and 12 miles broad. Pop. 42,100.

Great Kanawha, *ka-ná'wa*, a tributary of the Ohio River, has its rise between the Blue Ridge and Iron Mountains in the northwestern part of North Carolina, flows northeast by north through the southwestern part of Virginia, then changes its course northwest and west into West Virginia, and flows into the Ohio River at Point Pleasant. It receives the Gauley River in Fayette County, West Virginia, and from thence to its mouth is known by the name of Great Kanawha. The river, at a cost of over \$4,000,000, has been made navigable from the Ohio to Great Kanawha Falls, about three miles from the mouth of the Gauley River. It is about 450 miles in length.

Great Kanawha, Battle of. See POINT PLEASANT.

Great Lakes, the name given to the chain of lakes on the northern border of the United States. They include Lakes Superior, Michigan, Huron, Saint Clair, Erie, and Ontario; Michigan only lying wholly within the United States, and no one of the lakes wholly within the territory of the Dominion of Canada. Their area is about 90,000 square miles; elevation, Lake Superior 600 feet above the sea, and Lake Ontario 250 feet. The fall of Lake Superior to Lake Erie is about 40 feet. No large river flows into the Great Lakes; the Saint Lawrence River is the outlet. The basin of the Great Lakes averages in width about 100 miles north and south of the north and south shores respectively. The combined coast lines in the United States have a shore line of about 3,075 miles. These great inland seas constitute the largest body of fresh water in the world. Like all large bodies of water they affect the climate of the surrounding country. Good farms, extensive forests, and valuable minerals are found along the coast. On the southern shore of Lake Superior (q.v.) are found masses of ore and low mountains apparently of eruptive origin. The Great Lakes have been the means of developing to a considerable extent the Northwest, as they are the main thoroughfares by which the products of the large farms, the cattle ranches, the mines, and the forests have been brought to eastern markets. Coal and manufactured products of the east pass over the lakes to western markets. The bituminous coal tonnage of the lakes for 1899 was 9,000,000 tons. In the same year the net freight tonnage of Sault Ste. Marie's Falls canal was over 25,000,000 tons, or three times the amount which passed through the Suez Canal. The iron ore tonnage for 1900 was 20,000,000 tons. There are 20 individual ports on the Great Lakes which have a registered tonnage ranging from 1,000,000 to over 5,000,000 tons. Cleveland's tonnage alone, in 1902, was 5,037,282 tons; and the same year New York's tonnage was 8,982,767 tons. The line of cities around the Great Lakes are (1903) increasing in commercial importance and population with more rapidity than any group of cities in any other part of the world. Some of those lake ports, all terminals of railroad trunk lines, are Toledo, which increased 61

per cent from 1890 to 1900; Chicago, which increased in the same time 54 per cent; Cleveland, 46 per cent; Milwaukee, 39 per cent; and Buffalo, 37 per cent. The question of locating a dam at the outlet of Lake Erie so as to benefit navigation has been under consideration, and efforts are being made (1903) to have commissioners appointed by the governments of the United States and Great Britain who will work together, and report upon the conditions and uses of the waters adjacent to the boundary lines between the United States and Canada. In June 1903, the Congress of the United States took action regarding the matter, and empowered the President to appoint three American Commissioners; one to be an engineer officer of the army; another, a civil engineer, "well versed in the hydraulics of the Great Lakes;" the third, a lawyer "of experience in questions of international and riparian law." The necessity of such a commission to examine even the variations in the levels of the waters of this great thoroughfare is manifest when the levels of Detroit River, Lake Saint Clair, Saint Clair River, and Saint Mary's River have been lowered by the Government twenty-one-foot channels from Duluth and Chicago to Buffalo. The Chicago Drainage Canal (see Chicago) has helped to lower Lake Michigan. The Consolidated Lake Superior Company is taking water out of Saint Mary's River. Other causes are making a change of level, and the increased transportation on all the lakes, will mean better channels to the ocean. For canals connecting the Great Lakes with rivers and the two around water-falls, see articles on the respective lakes.

Great Meadows, Pa., Engagement at, 28 May 1754; Washington's first fight. When the French built Fort Duquesne (now Pittsburg), driving off an English force which had begun to fortify the same spot, it was evident that the decisive struggle for mastery of the American "hinterland" was to begin; and the commander of the nearest English force, a Virginia militia officer of 22, named George Washington, at once sent a messenger to Gov. Dinwiddie and wrote letters to the governors of Pennsylvania and Maryland, urging all to send troops and expel the French. Meantime he set out with his force to build a fort on the Monongahela where Brownsville, Pa., now stands. Constructing a road as he went, he halted at the Great Meadows of the Youghiogheny, a bushy field at the foot of Laurel Hill,—a good camping-place and defensible position. Hearing from his scouts that the French had learned of the English activity, and sent out a party to engage any English band they met, he cleared the field of bushes and threw up an intrenchment behind a ravine crossing the field; but instead of waiting an attack, took 40 men for a night surprise of the French, guided by Indian allies. It was raining hard, the path was often lost, and he did not reach the French camp till morning. They were an advance party of 32, sent out to reconnoitre and, hearing of Washington's advance, they had hidden in a rocky hollow and sent back for reinforcements, but attempting defense when surprised, the commandant—Ensign Jumonville—and nine men were killed, and the rest captured and taken to the camp at Great Meadows. Washington lost one killed and three wounded. The sequel is told under FORT NECESSITY.

GREAT PACIFICATOR — GREBES

Great Pacificator, a name given Henry Clay (q.v.), on account of his efforts to reconcile the conflicting interests of North and South, especially in connection with the Missouri Compromise.

Great Pedee, a river which has its rise in the mountains of the northwestern part of North Carolina, flows south and east across the State, and enters South Carolina at Marlboro County, in the northeastern part of the State, then flows southeast into Winyaw Bay, an inlet of the Atlantic. In North Carolina the river is called Yadkin. About where the Little Pedee joins the Great Pedee, and south to its mouth, there are several quite large islands. The river is navigable for a distance of about 150 miles from Winyaw Bay.

Great Salt Lake, a body of water in the northwestern part of Utah, the principal drainage centre of the Great Basin (q.v.); bounded on the east by the Wasatch Mountains, on the west by the Great Salt Lake Desert. It is about 4,200 feet above sea-level, 80 miles long and from 20 to 32 miles wide. Its chief inlets are the Bear, Ogden, and Weber, and the Jordan which brings the fresh waters of Lake Utah. Great Salt Lake has no apparent outlet save evaporation. In 1850 the amount of saline matter held in solution was 22.4 per cent, in 1869 only 14.8 per cent. Between these dates the amount of water flowing in annually exceeded the evaporation, and the lake increased in area from 1,700 to 2,360 square miles. Since 1869-70 the lake has been receding. One cause of the water diminishing in volume is the amount used for irrigation; but the amount of water contributed by the inlets has decreased since 1870. At one time Great Salt Lake was much larger than it is now. The bars, cliffs, and beaches formed by the waters of the ancient lake (called Lake Bonneville) are plainly visible along the base of the mountains. Lake Bonneville had an area of 19,800 square miles and a depth of 1,100 feet. Its depth near where the great Mormon Temple now is was about 850 feet. Its dry bed is now occupied by nearly 200,000 people. The waters of Lake Bonneville reached the ocean through Columbia River. Geological investigations show that there have been at least two moist periods with intervening and subsequent periods of dryness. A change from the present dry climate and scant rainfall to a moist climate would result in a great increase in area of the waters in the lakes and rivers and a return to former water areas. Great Salt Lake has several islands, the largest of which Antelope, is 18 miles long. No fishes seem to exist, but several species of insects and brine-shrimps have been found in the waters; and water-fowls in large numbers frequent the shore. The first mention of Great Salt Lake appeared in a report made by the Franciscans, in 1776. Father Escalante and companions seem to have traveled from Mexico to this region. A report made also by the Franciscans early in the 17th century mentions the large rivers and lakes and the mineral wealth of this section. In 1843 Fremont explored and described this region, and a thorough survey was made in 1849-59 by Howard Stansbury, captain in the United States Army. (See *UTAH*.) Consult: 'Jesuit Relations'; Bancroft, 'Utah'; U. S. Reports and Surveys.

Great Slave Lake, a body of water in the Canadian Northwest Territory, lat. 62° N.; greatest length about 300 miles, greatest breadth 50 miles. Estimated area, 10,100 square miles. By the Great Slave River it receives the waters of Lake Athabasca; and the outlet is the Mackenzie River which flows into the Arctic Ocean.

Great Slave River, in Canada, is the outlet of Athabasca Lake and flows into Great Slave Lake (q.v.), by two mouths, near Fort Resolution. A number of falls and rapids are in its upper course, but the descent becomes more gradual near its mouth. Length about 300 miles.

Great South Bay, an arm of the Atlantic Ocean on the southern coast of Suffolk County, Long Island, N. Y.; 50 miles long, from one and one-half to five miles wide. Great South Beach, which is about 35 miles long, has Fire Island lighthouse on the western extremity, and separates the bay from the ocean.

Great Stone Face, one of Hawthorne's short stories relating to the "Old Man of the Mountain" in the White Mountains, in 'Snow Image and Other Twice Told Tales' (1852).

Greatoresz, grát'ô-rëks, Eliza Pratt, American artist: b. Manor Hamilton, Ireland, 25 Dec. 1819; d. Paris, 9 Feb. 1897. She studied art in New York and Paris. Her work began in landscape painting, but pen and ink work and etching subsequently absorbed her efforts. In 1868 she was elected associate of the National Academy. In 1870 she visited Germany and in 1871 published 'The Homes of Oberammergau.' Her principal works are 'Summer Etchings in Colorado' (1873) and 'Old New York from the Battery to Bloomingdale' (1876).

Grebes, grëbz, a well-defined group of water-bird (*Colymbidæ* or *Podicipidæ*) comprising 25 species, spread over practically the whole world. The grebes are peculiar in having the legs placed very far back, in their flattened tarsi and lobed (not webbed) toes, each digit being flattened and bordered by an extension of horny skin. They are expert swimmers and pre-eminent as divers. They nest in secluded ponds and bogs, piling up a mass of vegetable matter upon some floating foundation, and deposit chalky white eggs. When the female leaves the nest she usually covers the eggs over with vegetable matter. The little grebes are expert swimmers and divers from the time they are hatched, and in their soft downy plumage are exceedingly beautiful. During migrations grebes are found frequently along our rivers and sea coasts, and are often shot by duck hunters in the autumn and winter. Though they have no stiffened tail feathers, and have relatively very small wings, they are able to fly long distances. The body plumage is soft and compact, and that of the under surface is a beautiful silvery white, which makes "grebe-breasts" a very desirable article in the millinery trade. The best-known species in eastern North America are the horned grebe (*Colymbus auritus*) which has a peculiar ruff of black and rusty feathers about the head; and the pied-billed grebe (*Podilymbus podiceps*) a rather more heavily built bird without a ruff and with a thicker and shorter bill. Both are popularly known as "hell-divers." In Europe the common species are the horned grebe, the great crested grebe (*C. cristatus*) and the dabchick (*C. flavirostris*).

GREECE

Greece, Ancient, the European peninsula which was bounded on the north by Macedonia and Illyria; on the east and southeast by the Ægean and Myrtoan, and in the west, and southwest, by the Ionian seas. Its length from the borders of Macedonia to Cape Tænarum was about 262 miles. The name of *Græcia* originated in Italy, and was probably derived from Pelasgian colonists, who, coming from Epirus to Magna Græcia, in southern Italy, and calling themselves *Græci*, occasioned the application of this name to all the people who spoke the same language with them. In earlier times, for example, in the time of Homer, Greece had no general name among the natives. Aristotle was the first Greek to call his countrymen *Ἕλληνες*, Greeks. It afterward received the name of *Hellas*, and still later, after the country was conquered by the Romans, it was divided into two provinces: the Peloponnesus being known as Achaia, and the remaining regions to the north as Macedonia. The Grecian tribes were so widely dispersed that it is difficult to determine with precision the limits of Greece, properly so called. The name perhaps is properly applied only to the country lying to the south of Macedonia, with the adjacent islands; but it has sometimes been given in a modern sense by geographers to the whole territory lying to the south of Mount Hæmus, Mount Scomius, and the Illyrian Alps, or the whole series of mountains now called the Balkan, so as to include regions inhabited by some Thracian, Macedonian, and Illyrian tribes. The area of the mainland of the more limited region to which the name of *Hellas* is properly confined is above 55,000 square miles. The whole of Greece naturally divides itself into three parts: Northern Greece, including Epirus and Thessaly; Central Greece, which comprises what was known as *Hellas*; and the Peloponnesus.

Physical Features.—The first thing which strikes the eye on looking at a map of Greece is the comparatively great extent of its coastline, formed by numerous gulfs which penetrate into it in all directions, and give it a remarkably broken and rugged appearance. Proceeding round the coast from the northwest to the northeast we are presented in succession with the Ambracian Gulf (now Gulf of Arta), Corinthian Gulf (the mouth of which is now called the Gulf of Patras, while the name of Gulf of Corinth is reserved for the inner part of it), the Cyparissian (now Arcadian) Gulf, and the Messenian, Laconian, Argolic, Saronic, Maliac, and Pagasæan gulfs, now called respectively Koron, Marathon, Nauplia, Athens, Lamia, and Volo. The Corinthian Gulf on the east, and the Saronic Gulf on the west, which nearly meet at the Isthmus of Corinth, divide Greece into a continental and a peninsular portion, the latter called the Peloponnesus (now Morea). Another striking feature is the mountainous character of the interior. The whole country was bounded on the north by a range of mountains, the western half of which was called Mount Lingon and the eastern half the Cambunian Mountains, with Mount Olympus at their eastern extremity. From about the middle of this range a lofty chain, called Mount Pindus, strikes southward and runs almost parallel to the eastern and western coasts of Greece. At a point in this chain called Mount Tymphrestus

or Typhrestus (now Mount Velukhi), two chains proceed in an easterly direction, the northernmost of which, Mount Othrys, runs almost due east, and attains at some points a height of from 7,000 to 8,000 feet, while the southern one runs rather in a southeasterly direction, attaining at one point a height of 8,240 feet, and terminates at the celebrated pass of Thermopylæ. The Cambunian Mountains on the north, the range of Pindus on the west, and Othrys on the south, enclose the large and fertile vale of Thessaly, forming the basin of the Peneus (now Salambria), and the ranges of Othrys and Oeta enclose the smaller basin of the Sperchius (Hellada). Another range of mountains branches off from Mount Oeta and runs still more to the south. This is the celebrated Parnassus, which, at its highest point, exceeds 3,000 feet. The peaks of Cithæron, Parnes, Pentelicus, and Hymettus lie in the same direction, but are more distinguished for their classic celebrity than for their height. The range in which these peaks are found is continued to the southeast point of continental Greece, and the islands of Ceos, Cythnos, Seriphos, and Siphnos (now Kea, Thermia, Serpho, and Siphanto) may be regarded as continuations of it. This range on the south and that of Oeta on the north enclose the basin of the Cephissus, with Lake Copais (now Topolia). Another chain of mountains strikes southwestward from the central range of continental Greece, under the names of Corax and Taphiassus. The chief rivers on the west side of the Pindus chain are the Arachthius (now Arta) and the Achelous (now Aspropotamo).

The chief feature in the mountain system of the Peloponnesus is a range or series of ranges forming a circle round the valley of Arcadia in the interior, having a number of branches proceeding outward from it in different directions, dividing the rest of the Peloponnesus into several other valleys. The loftiest part of the mountainous circle round Arcadia is that lying to the north, with the peak of Cyllene (Ziria), 7,789 feet high, at its eastern extremity, and Erymanthus (Olonos), 7,297 feet high, at its western. The southern part consists rather of a series of heights than a chain of mountains. The highest range which branches off from the circle around Arcadia, and, indeed, the highest range in the Peloponnesus, is Mount Taygetus (Pentadactylon), which strikes southward, separating the ancient divisions of Messenia and Laconia, and terminating in the promontory of Tænarum (now Cape Matapan). The other chains are of no importance. The only rivers in the Peloponnesus of any consequence are the Eurotas (Iri), draining Laconia on the southeast; the Pamisus (Pirnatza), draining Messenia on the southwest; the Alpheus (Ruphia), draining Arcadia and Elis; and the Peneus (Gastuni) draining Elis on the west.

The rock most largely developed in the mountains of Greece is limestone, which often assumes the form of the finest marble. Granite and gneiss are found only in the north, in the eastern ramifications of the Pindus. Tertiary formations prevail in the northeast of the Peloponnesus; and in the northwest, along the shores of Elis, are considerable tracts of alluvium. Volcanic rocks are not seen on the

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mainland, but form considerable masses in some of the islands. Attica was rich in silver and marble. The quarries of Pentelicus and the mines of Laureium were famous. Gold and serpentine were found in Siphnos; there was tin in Ceos, and copper near Chalcis in Eubœa. In many of the islands iron abounded.

Divisions.—On the northwest of the mainland of Greece was the mountainous region of Epirus, which was never more than half Greek; and to the east of that district, separated from it by the chain of Pindus, lay Thessaly, a region of fertile plains. To the south, lay a series of small independent states. Reckoned from west to east, there were Acarnania, Ætolia, Doris and Locris, Phocis with Mount Parnassus, the seat of the Muses, and the sacred Delphi, regarded by the Greeks as the navel of the earth; Boœtia, with Helicon, another mountain sacred to the Muses, and with the cities of Thebes and Platœa; Megaris, containing the city of Megara; and Attica with its capital Athens, Piræus, the port of Athens, and the city of Eleusis, the seat of the mysterious worship of Demeter. In the middle of the Peloponnesus was Arcadia, with the towns of Mantinea, Tegea, and Megalopolis, the last founded by Epaminondas. In the north lay Sicyon and Corinth, the latter situated on the isthmus connecting the Peloponnesus with the rest of Greece; and to the west of that Achaia. To the southwest of Achaia lay the rich province of Elis, with the plain and sacred grove of Olympia, celebrated on account of the Olympic games, which were held here every fourth year. To the south of Elis, in the southwest corner of the Peloponnesus, lay the province of Messenia, with the famous stronghold of Ithome, "one of the horns of the Peloponnesus," the fort of Pylos, and later the capital town of Messene, founded by Epaminondas 369. Separated from Messenia by the range of Taygetus was the province of Laconia, occupying the southeast corner of the Peloponnesus, and containing the renowned city of Sparta, long the rival and ultimately the conqueror of Athens. Lastly, to the north of Laconia, the east of Arcadia, and the south of Sicyon, lay the province of Argolis, with the capital Argos, and the cities of Mycenæ and Tiryns, all remarkable for the remains of gigantic works of masonry, commonly known as Cyclopean works.

The islands of Greece are partly scattered over the Ægean Sea and partly contained in the Ionian Sea on the southwest of the mainland. The Greeks applied the names Cyclades and Sporades to two groups of islands in the Ægean, the former name (from *kuklos*, a circle) to those which they believed to form a circle round the sacred island of Delos, and the latter (from a Greek root meaning scattered, sporadic) to those which were scattered over various parts of the sea. Some islands were sometimes said to be in the one group and sometimes in the other, and several were sometimes excluded from both. The following, however, are the principal of those which may most properly be considered as belonging to the Cyclades: Andros, Tenos, Myconos, Naxos (now Naxia), Paros (celebrated for its marble), Amorgos, Anaphe, Thera (now Santorin), Pholegandros (now Polykandro), Sicinos, Ios (now Nio), Melos, Syros, and Gyaros (Jura), Siphnos, Seriphos, Cythnos, and Ceos. The name

Sporades may be applied to all the other islands in the Ægean. The Sporades will thus include the following islands on the northeast of the mainland of Greece: Eubœa (Negropont), the largest of all the Greek islands, separated from the continent only by the narrow strait of Euripus, and containing the ports of Chalcis and Eretria; Sciathos, Scopelos, Halonesus (Kilidromi), Eudemia (Sarakino), and Scyros; the following off the coasts of Thrace and Asia Minor: Lemnos, Thasos, Imbros, and Samothrace (in very remote times the seats of a mysterious religious worship) Lesbos (with the flourishing and luxurious town of Mitylene), Chios, Samos, Cos, etc.; and the following in the Saronic Gulf, or between it and the Argolic Gulf: Salamis (now Salamis or Koluri), Ægina, Calauria (Poros), Hydrea (Hydra), and Pityussa (Spetsæ). The islands in the Ionian Sea are Corcyra (Corfu), celebrated in the most ancient times for its wealth and culture, and at a later period colonized by Corinthians; Paxos, Leucas or Leucadia (Santa Maura), at one time connected with the mainland; the "rocky" Ithaca (now vulgarly called Ithaki), the home of Ulysses; Cephallenia (Cephalonia), Zacynthus (Zante), and Cythera (Cerigo), one of the seats of the worship of the goddess Aphrodite.

Soil, Productions, Etc.—Greece was in ancient times more fertile than it is now, which is accounted for by the fact that the forests have been to a large extent cleared away, the springs thus dried up, and the soil deprived of moisture. The most fertile districts were Thessaly, Boœtia, and some parts of the Peloponnesus; the least fertile Attica and Arcadia. The principal objects of cultivation were the vine and the olive, but flax and the commoner cereals were also cultivated more or less. Among the domestic animals were horses, asses, mules, oxen, swine, sheep, goats, and dogs. Swine were very numerous everywhere, and mules were much used in the Peloponnesus; but there were comparatively few horses, as the mountainous character of the country was not conducive to their being reared; the best horses of Greece were reared in Thessaly. Bears, boars, and wolves are mentioned among the wild animals anciently found in Greece, and it may perhaps be inferred from the legend of the Nemean lion that even lions at one time existed in this country. Herodotus, indeed, expressly states that lions were found between the Nestus in Thrace and the Achelous in Acarnania.

Climate.—The climate of ancient Greece is highly commended by ancient Greek writers, as by Herodotus, Hippocrates, and Aristotle, on which account it seems fair to infer that the malaria which now infests the air in summer did not then prevail to the same extent, a circumstance that is easily accounted for by the fact that in those times the country was more thickly populated and better cultivated. In respect of temperature the same differences resulting from the inequalities of the surface must have existed then as exist now, long and severe winters being experienced in the highlands of the interior, while the lowlands, exposed to the sea, enjoyed warm and genial weather all the year round.

History.—Greece has never at any period formed a single and independent state. As long as it remained independent it was divided into a number of separate states, and during

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the only period when it was administered as a single territory it was subject to a foreign power. A general sketch of the history of ancient Greece must therefore touch only upon those leading events which belong to the common history of the Greek states, or which at least affected the Greek people as a whole, even although they may belong more especially to the history of an individual state.

The earliest inhabitants of Greece of whom anything is known are called by Greek writers Pelasgians. The ethnological affinities of these have often been discussed, but the most recent authorities believe that they were an Indo-Germanic or Aryan people. They occupied Greece before the influx of Ionians, Æolians and Dorians. They seem to have been agricultural in pursuits, dwelt along the fertile valleys, built strong cities, walls of the so-called cyclopean masonry, and among their most famous seats were Dodona in Epirus, Thessaly, Orchomenos in Bœotia, Mycenæ in Argolis, Sicyon, etc.

In religion they abhorred both polytheism and anthropomorphism. Their name afterward became changed to Hellenes and under this appellation they amalgamated with the Ionians, the Achæans, the Æolians and the Dorians. The early relations of Greece with the East are perhaps reflected in the legends of Oriental colonists—Cadmus, Pelops, Cecrops, etc.—who settled in Greece in very remote times. The reality of an early connection between Greece and the East is established by the fact that the Greeks derived the greater part of their alphabet from the Phœnicians.

The Hellenes, or Greeks properly so called, entering the country probably from the northwest, subdued and partly displaced the Pelasgians. They are usually represented as having been divided into four chief tribes—the Æolians, occupying the northern parts of Greece (Thessaly, Bœotia, etc.); the Dorians, occupying originally only the small region in the neighborhood of Mount Cæta; the Achæans, occupying the greater part of the Peloponnesus; and the Ionians, occupying the northern strip of the Peloponnesus and Attica. The middle part of the Peloponnesus was still mainly inhabited by a Pelasgic population. The warlike and enterprising character of these Hellenic invaders is evidenced by the poetic legends of their achievements in the heroic ages, such as the tale of the Trojan War, of Theseus, of Jason and the Argonauts, etc. From all these we may gather at least that the Hellenes early distinguished themselves by building towns, making long voyages, planting distant settlements, and carrying on foreign wars. As in later times, they were divided into numerous states, each consisting of a single city with the surrounding territory. These states were governed by kings who were the heads of the supreme families, and who traced their descent from Zeus. By the side of the kings stood the heads of the other leading families of the state, who in Homer are also called kings, and likewise boasted of a descent from Zeus. In the public market-place (agora), where all the affairs of the state were transacted, these subordinate kings gave their opinions on every subject of deliberation, and advised the supreme ruler as to the course he should pursue, but beyond that they had no authority. Their

influence, however, was very great, especially where the rightful head of the state did not possess the abilities of a ruler.

The distribution of the Hellenic tribes which we have just indicated is not that which continued throughout the main period of Greek history. It was entirely altered by an event called the Dorian migration, or sometimes the return of the Heracleids, which is placed by Thucydides about 80 years after the fall of Troy, and thus about the year 1104 B.C., according to the ordinary system of chronology. Before the great migration several smaller ones had taken place. One tribe, finding its territory too circumscribed, would move to another, expelling the inhabitants already settled there, who thus found themselves compelled to remove to some other district, where they treated the original inhabitants in the same way that they had been treated themselves. In this way there arose a general disturbance, till at last the hardy Dorian inhabitants of the mountainous region about Mount Cæta began a migration on a greater scale than had hitherto been attempted, and thus brought about a series of changes which resulted in an entirely new settlement of the Greek territory. They first conquered a large part of northern Greece, and then entered and subdued the greater part of the Peloponnesus, driving out or subjugating the Achæans, as the Achæans had driven out or subjugated the Pelasgians. The Dorians are also said to have invaded Attica, where, however, they were baffled, according to the legend, by the self-devotion of Codrus, the king of that territory. It is said that an oracle had pronounced that in this war whichever side lost its king would be victorious, on which account strict orders were given to the Dorian soldiers to spare the life of the king of the enemy. But Codrus disguised himself in the dress of a common herdsman, and going into the enemy's camp provoked a quarrel in which he met his death, on learning which the Dorians despaired of success and withdrew. In the legend in which this series of events has come down to us the Dorians are represented as having entered the Peloponnesus under Temenus, Cresphontes, and Aristodemus, three descendants of Heracles, who had come to recover the territory of which their ancestors had been unjustly deprived by Eurystheus. Hence the name of the Return of the Heracleids, sometimes given to this event.

The Achæan inhabitants of the Peloponnesus whom the Dorians found there had a threefold fate. One part of them sought for new homes, and turned their steps toward the part of the Peloponnesus occupied by the Ionians, whom they expelled, keeping for themselves their territory, which hence received the name of Achaia. Another part voluntarily submitted to the invaders, who imposed tribute upon them and excluded them from all share in the government; while a third part resisted to the last, and were in the end reduced to the condition of slavery. In Laconia the former received the name Perieci (dwellers round), and the latter were called Helots.

The Ionians who were driven out of the Peloponnesus found at first a refuge among their kindred in Attica, but when this district did not suffice for all the inhabitants, old and new, large numbers of them left it and founded

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1. Parthenon, on the Acropolis, Athens.
2. Temple of Victory, on the Acropolis, Athens.

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Ionian colonies on several of the islands of the Ægean Sea and on the middle part of the coast of Asia Minor, where they built 12 cities, which formed an Ionic Confederacy. The principal of these were Ephesus and Miletus. About the same time as the Ionians are said to have colonized the middle part of the seaboard of Asia Minor, another body of Greeks, proceeding from Thessaly and Bœotia, are said to have founded the Æolian colonies on some of the northern islands of the Ægean, and on the northern part of the western coast of Asia Minor. The Æolic colonies of Asia Minor also formed a confederacy of 12 cities, but the number was afterward reduced to 11 by the accession of Smyrna to the Ionic Confederacy. While Ionians and Æolians thus colonized the middle and northern islands of the Ægean and coasts of Asia, the southern islands and the southern part of the west coast of Asia Minor were in like manner colonized by Dorian settlers. The six Doric towns in Asia Minor, along with the island of Rhodes, formed a confederacy similar to the Ionic and Æolic ones.

In considering the subject of Greek colonization we are brought face to face with the fact that in settling in foreign lands, the Greek races kept distinct from each other. One of the great keys to an understanding of Greek history is a right understanding of the relation between the two great races of the Greek name, the Dorians and Ionians. The Dorians were inland mountaineers, the Ionians were of the seacoast. The former, as represented in the institutions of Sparta, were a practical, and conservative race, living in public, simple and unimaginative. Their poetry was the public ode, accompanied with the dance in the market-place, often carried on under arms. The Ionians were versatile, imaginative, impressible. They were devoted to the maritime life, were travelers, and fond of welcoming strangers to their cities. They were traders. Moreover, they were keenly intellectual and reached the summit of excellence in art, literature, and philosophy. Their poetry was the epic narrative; and they invented the drama, in which the Ionian tale of personal adventure was united with the Doric ode. These two contrasted races between them swayed the fate of Greece. Their relations were complicated by the different colonies which they established at different points on the Mediterranean and Euxine coasts. In the course of time new Greek settlements were made on the coasts of the Hellespont, the Propontis (Sea of Marmora), and the Black Sea by both Dorians and Ionians. The most important of these were Byzantium (Constantinople) (Dorian), Sinope (Ionian), Cerasus (Ionian), and Trapezus (Trebizonde) (Ionian). Further, there were flourishing Greek colonies on the coasts of Thrace and Macedonia; for example, Abdera, Amphipolis, Olynthus, Potidæa, etc., which were all Ionian; and the Greek colonies in Lower Italy were so numerous that the inhabitants of the interior spoke Greek, and the whole region received the name of Greater Greece. The most famous of the Greek colonies in this quarter were Tarentum, Sybaris, Croton, Cumæ, and Naples. The island of Sicily also came to a great extent into the hands of the Greeks, who founded on it or enlarged many towns. By far the largest, most powerful, and most highly cultured of the

Greek colonies was the Dorian colony of Syracuse, founded in the 8th century B.C. On the north coast of Africa the Dorian colony of Cyrene rivaled it: wealth and commerce the city of Carthage; and on the south coast of Gaul Ionian Massilia (Marseilles) presented a model of civilized government to the inhabitants of the surrounding districts. All these towns kept up a commerce in the products of the land in which they were planted. They exerted a most important and beneficent influence on the manners of the neighboring inhabitants. They preserved the customs and institutions of their mother city, which they regarded with filial reverence; but otherwise they were perfectly free and independent.

Although ancient Greece never formed a single state, the various Greek tribes always looked upon themselves as one people, and classed all other nations under the general name of *Barbaroi* (foreigners). There were four chief bonds of union between the Greek tribes. First and chiefly they had a common language, which, though it had considerable dialectic peculiarities when spoken by different tribes, was yet understood throughout every part of Greece and in all the Greek colonies. Secondly, they had common religious ideas and institutions, and especially in the oracle of Delphi (q.v.) they had a common religious sanctuary, which was held by all the states in equal reverence, and was resorted to from all parts of Greece, alike by communities and individuals, for advice in circumstances of difficulty, and not unfrequently for indications as to the future. Thirdly, there was a general assembly of the Greeks called the Amphictyonic League (q.v.) in which the whole nation was represented by tribes (not by states), and the chief functions of which were to guard the interests of the sanctuary of Delphi, and to see that the wars between the separate states of Greece were not carried on in too merciless a manner. When any of the ordinances of the league were violated it was its duty to see that the violators were punished, and to entrust the infliction of the punishment to some one of its members. The fourth bond of union between the tribes of Greece consisted in the four great national festivals or games, the Olympian, Isthmian, Nemean, and Pythian (qq.v.) which were held at different intervals in four different parts of Greece, in which all Greeks, and none but Greeks, were allowed to participate, and which slaves were not allowed even to witness. At these games contests took place in foot-racing and chariot-racing, boxing, wrestling, and throwing with the quoit (or discus), and prizes were also awarded for works of art, poems, dramas, histories, etc. The prize was a simple wreath of olive or pine branches, or of parsley; but such a prize brought glory not only on the winner himself, but on his whole family and kindred, and even on the state to which he belonged. The victor was welcomed home by a triumphal procession, and his victory was celebrated in odes sung on the occasion, and sometimes composed by such poets as Simonides and Pindar. The Olympic games were the most celebrated of these festivals. They were held in the summer once every four years at Olympia, in Elis; the month in which they were held was considered as sacred, and during it no acts of hostility were allowed to take place between

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any of the Greek states. Originally, the only contest was a foot-race, and so high was the honor of a victory in this race esteemed, that from that of Coræbus in 776 B.C. the whole of Greece reckoned the time. The year in which any event happened was styled the first, second, third, or fourth year of a certain Olympiad, the name given to the interval elapsing between each celebration.

The various small states of Greece may be divided, according to the form of their constitution, into the two great classes of aristocratic and democratic. Sparta or Lacedæmon, the chief town of Laconia and of the Dorians, was the leading aristocratic state; and Athens, the capital of Attica and the chief town of the Ionians, was the leading democratic state; and as a rule all the Doric states, and subsequently all those under the influence of Sparta, resembled that city in their constitution; and all the Ionic states, and those under the influence of Athens, resembled it. These two races are the only ones that come into prominence during the earlier part of Greek history subsequent to the Doric migration. Sparta is said to have derived its form of government, and all its institutions, near the close of the 9th century B.C., from Lycurgus, who made minute regulations as to the course of education and the mode of life among the Spartans. He had but one object, that of training the Spartan youth for war, and developing a hardy and warlike spirit among the people. The immediate results of this training were seen in the conquests which the Spartans effected over the surrounding states, especially over the Messenians in the 8th and 7th centuries B.C. Many of the vanquished Messenians left their native country and founded the city of Messana in Sicily. Those who remained were reduced to the condition of Helots (q.v.).

The constitution of Athens was not originally democratical, but monarchical. Afterward it became aristocratic, and first received a more or less democratic constitution from Solon at the beginning of the 6th century B.C. This was followed about 50 years later by a despotic monarchy under the celebrated "tyrant" Pisistratus, and his sons, Hippias and Hipparchus, the last survivor of whom, Hippias, reigned in Athens till 510 B.C. Hipparchus had been assassinated four years before; and the last four years of the reign of Hippias were distinguished by violence and cruelty. His enemies drove him from Athens, after which the republic was restored in a more purely democratic form than at first.

Hippias found refuge at the court of the king of Persia, with whose aid he hoped to be able to return and rule once more in Athens. The Persian monarchy had been established about 30 or 40 years before by Cyrus the Great, and its sway extended not only over the whole of Persia, Media, and Babylonia, but also over Egypt and Asia Minor. With the rest of this last-mentioned territory the Greek colonies on the coast had been brought under the yoke of this empire, and although they chafed under the foreign dominion, they were kept in subjection by the native princes or tyrants whom the Persian monarch imposed on them as governors. One of the most powerful of these governors was Histæus of Miletus, whose behavior had excited the distrust of Darius, the Persian king,

for the latter, on the pretence of rewarding him for a signal service invited him to his court and kept him at Susa in practical captivity. Histæus secretly incited his relative, Aristagoras of Miletus, to get up a rising among the Greek colonies of Asia Minor, in the hope that he might, during the disturbance, find an opportunity of returning to his home. The endeavors of Aristagoras were successful; all the Greek towns on the coast were soon in arms, and assistance was asked from the mother country. Only Athens, which feared lest Darius should re-establish Histæus, and the small Ionian town of Eretria in Eubœa, furnished any aid. The Greeks, in 496 B.C., conquered and burned the town of Sardis, the capital of Asia Minor, whereupon the rebellion extended over the whole of Ionia. But the superior forces of the enemy, and the want of union among the insurgents, led in the following year (495) to the loss of a naval battle, and soon after to the destruction of Miletus, the inhabitants of which were partly put to death and partly made captives.

Darius now determined to avenge himself on the Athenians and Eretrians for the part that they had taken in the rising. In 492 he sent out an expedition against them under his son-in-law Mardonius, but the Persian fleet was wrecked off the promontory of Mount Athos. Darius had at the same time despatched heralds to the islands and states of Greece to demand earth and water in token of submission. Most of the islands and many of the smaller states yielded, but Athens and Sparta indignantly refused the demand, and even went the length of putting the heralds to death. Enraged at this insult Darius equipped a second fleet and placed it under the command of Datis and Artaphernes. But this met with no better fate than the first. The Persians landed on the island of Eubœa, and after destroying Eretria, crossed the Euripus into Attica; but here they were met (490 B.C.) on the plain of Marathon by 10,000 Athenians and 1,000 Plateans, under Miltiades, and, although 10 times as numerous, were totally defeated and pursued to their ships. This battle put an end to the second Persian expedition, but Darius at once began to make preparations for a third expedition, and this time on a far greater scale than before. In the midst of these preparations he died, but his son Xerxes, collected an army of 1,700,000 men and a fleet of 1,200 large ships besides a number of smaller ones, crossed the Hellespont in 481 by means of two bridges of boats, and led his army through Thrace, Macedonia, and Thessaly, while his fleet followed the line of coast. Thessaly had surrendered without a stroke, and Xerxes at once pursued his march in the direction of Phocis. But before he could enter this territory he had to make his way through the narrow and difficult pass of Thermopylæ, and this had previously been occupied by 300 Spartans under Leonidas, along with several thousand allies. Here Xerxes in vain attempted to force a passage against a mere handful of Greeks: thousands of his troops were slain; and it was only after Ephialtes had betrayed to the Persians a foot-path which led over the heights of Ceta to the rear of the defenders of the pass, that the Persian king effected his purpose. Leonidas allowed all the allies to depart, while he himself and his 300 Spartans,

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along with 700 Thespians who voluntarily remained with them, held out until they were completely annihilated (480 B.C.).

The way through Phocis and Boeotia was now open to the Persians, who advanced into Attica, and laid the city of Athens in ruins, putting to death the small garrison. The women and children belonging to Athens had by this time, on the advice of Themistocles, been removed to Salamis, Ægina, and Troezen, while all the men capable of bearing arms served in the fleet. It was to Themistocles that the deliverance of Greece was now chiefly due. The united fleet of the Greeks had already contended with success against that of the Persians off the promontory of Artemisium, in Euboea, and had then sailed into the Saronic Gulf, whither it was followed by the enemy. In this confined arm of the sea, where there was no room for the manœuvring of the numerous ships of the enemy, a decisive battle between the two fleets took place with the result that Themistocles had anticipated, the total defeat of the Persians. This battle is known as the battle of Salamis, from the name of an island in the Saronic Gulf, and was fought in the same year as Thermopylæ (480 B.C.). Xerxes himself had been an eye-witness of the battle and at once began a speedy retreat with his land army through Thessaly, Macedonia, and Thrace, a retreat which Themistocles had hastened by causing the false report to reach Xerxes, that it was the intention of the Greeks to destroy the bridges of boats over the Hellespont. Xerxes left behind him only 300,000 men in Thessaly. In the spring of the following year (479) these advanced into Attica and compelled the citizens once more to seek refuge in Salamis; but in the battle of Platæa the Greeks, under the command of Pausanias, obtained so complete a victory, that only 40,000 of the Persians reached the Hellespont. On the same day the remnant of the Persian fleet was attacked and defeated by the Greeks off Mount Mycale, near Samos on the Ionian coast of Asia.

By the brilliant part which the Athenians under Themistocles had played against the Persians, the influence of Athens had greatly increased throughout Greece; and this was further strengthened by the fact that the war against Persia, which still continued, was chiefly conducted by sea, where Athens was much more powerful than Sparta. From this date then begins the period of the leadership or *hegemony* of Athens in Greece, which continued to the close of the Peloponnesian war, 404 B.C. Athens now exerted her influence to form a confederacy including the Greek islands and maritime towns as well as Athens herself, the object of which was to provide for the continuance of the war by the payment into a common treasury at Delos, of a fixed sum of money, and by furnishing ships for the same purpose. In this confederacy Athens of course had the lead, and gradually was able to render tributary many of the islands and smaller maritime states. In 469 B.C. the victories won by the Athenians over the Persians was crowned by the double victory of Cimon, the son of Miltiades, over the fleet and army of the Persians on the river Eurymedon, in the south of Asia Minor; and this victory was followed by the Peace of Cimon, which secured the freedom and independence of all Greek towns and islands. Shortly after followed the bril-

liant administration of Pericles, during which Athens reached the height of her political grandeur, while at the same time she flourished in trade, in arts, in science, and in literature.

The position of Athens, however, soon raised up a number of enemies. Sparta regarded her prosperity with jealousy; and the arrogance of Athens had produced a pretty general feeling of indignation and hatred. Two hostile confederacies were formed in Greece. At the head of one of these confederacies was the city of Athens, which was joined by all the Ionian states of Greece, and more or less supported by the democratic party in every state. At the head of the other confederacy stood Sparta, which was similarly joined by all the Dorian states, and supported by the aristocratic party everywhere. At last in 431 war was declared by Sparta on the complaint of Corinth that Athens had furnished assistance to the island of Corcyra in its war against the mother city; and on that of Megara, that the Megarean ships and merchandise were excluded from all the ports and markets of Attica.

In the first part of the Peloponnesian war the Spartans had considerable successes, while a great calamity befell the Athenians, who had collected all the inhabitants of the country districts of Attica within the walls of the city; and in consequence a pestilence broke out which carried off thousands of the inhabitants, and among them Pericles himself. From this blow, however, the city soon recovered, and in 425 the early successes of the Spartans in Attica were compensated by the capture of Pylos in Messenia by the Athenian general Demosthenes, who at the same time succeeded in shutting up 400 Spartans in the small island of Sphacteria, opposite Pylos, where they were ultimately starved into surrender. The person to whom the surrender was made was the demagogue Cleon, who, in consequence of his military successes, obtained the command of an army which was sent to operate against the Spartan general Brasidas in Thrace. But in 422 he was defeated by Brasidas before the town of Amphipolis, and himself slain, after which the opposite party in Athens got the upper hand, and concluded the peace with Sparta known as the Peace of Nicias (421 B.C.).

The effect of this peace was to divide the Spartans and the Corinthians, who had hitherto been allies. The latter united themselves with Argos, Elis and some of the Arcadian towns to wrest from Sparta the hegemony of the Peloponnesus. In this design they were supported by Alcibiades, a nephew of Pericles, a man of handsome figure and great personal accomplishments. The war which was now waged between Sparta and Corinth with her allies resulted, however, in favor of the former, whose arms were victorious at the battle of Mantinea in 418.

Soon after this the Athenians resumed hostilities, fitting out in 415 B.C. a magnificent army and fleet, under the command of Alcibiades, Nicias, and Lamachus, for the reduction of the Dorian city of Syracuse in Sicily. This undertaking, which renewed the race hatred between Sparta and Athens, was a complete failure. Alcibiades was accused in his absence of several offenses against religion and the constitution, and deprived of his command. Thirsting for revenge, he betook himself to Sparta, and ex-

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horted the city to renew the war with Athens. By his advice one Spartan army was despatched to Attica, where it took up such a position as prevented the Athenians from obtaining supplies from Eubœa, while another was sent under Gylippus to assist their kindred in Sicily. These steps were ruinous to Athens. Lamachus fell in the siege of Syracuse, and the Athenian fleet was totally destroyed. The reinforcements sent out under Nicias and Demosthenes were defeated (413 B.C.) by the combined Spartan and Syracusan armies. All the Athenians who escaped death were made captives and compelled to work as slaves in the quarries of Sicily, although it may be mentioned as an interesting fact that many of these captives obtained their liberty by being able to recite fragments of Euripides.

After this disaster many of the allies of Athens joined the Spartans, who now pressed on the war with greater energy. The Athenians recalled Alcibiades, who returned in 407, and was received by his fellow-citizens with enthusiasm as their expected deliverer. A few months later he was again an exile, having been deprived of the command because one of his subordinates had lost a naval battle fought off Ephesus in his absence. During the rest of the war the Athenians had only one success, the naval victory won off the islands of Arginusæ over the Spartan Callicratidas in 406. In the following year (405) the Spartans made themselves masters of the whole of the Athenian fleet except nine vessels, while the majority of the crews were on shore at Ægospotamos on the Hellespont. The Spartans now easily subdued the islands and states that still maintained their allegiance to the Athenians, and laid siege to Athens itself. In 404 B.C. the war was terminated by the Athenians' surrender. Sparta immediately imposed upon Athens an aristocratic form of government, placing the supreme power in the hands of the Thirty Tyrants. Only a year later, however (403), Thrasybulus was able to overthrow this hated rule and re-establish the democracy.

The fall of Athens resulted in Sparta's leadership or hegemony in Greece, which lasted till the battle of Leuctra, 371 B.C. The Spartans now abused their power and speedily roused the hatred and jealousy of the other states. The Greek states which had up to this time been, and still continued to be, leaders, had now lost almost entirely their manliness and independent spirit, and no longer maintained the hereditary war against Persia, but each sought the aid of that power for its own purpose. The Spartans did indeed send an expedition into Asia Minor, but it came to nothing; and the states of Greece, the Spartans included, at last, in 387, agreed to the disgraceful Peace of Antalcidas, by which the whole of the west coast of Asia Minor was ceded to the Persians, and the Greek colonies there thus deprived of the independence that had been secured to them by the Peace of Cimon.

An act of violence committed by a Spartan general in Thebes in 380 in the end led to the complete downfall of that city. The aristocratic party in Thebes, when the Spartan army happened to be in the neighborhood, prevailed upon the general to give his assistance in overthrowing their opponents and establishing an aristocratic government. A number of the less prom-

inent members of the defeated party, among them Pelopidas, made their escape to Athens, where they got the support and assistance of the democratic party there. They soon returned in disguise to their own city, surprised and murdered the leaders of the aristocratic party, expelled the Spartan garrison, and again set up a democratic government. These circumstances give a good idea of the fury of party strife which was then general in the Greek cities. The immediate result of this counter-revolution in Thebes was a war with Sparta, the heroes of which were Epaminondas and Pelopidas, who were then at the head of affairs in Thebes. In the course of the war the Spartans invaded Boeotia, but were so completely defeated at Leuctra in 371 B.C. that they never fully recovered from the blow.

With this victory Thebes won hegemony in Greece, which she maintained during the lifetime of Epaminondas, whose policy it was to keep down the power of Sparta by strengthening the surrounding states. From him the Messenians recovered their freedom, and by his advice the cities of Arcadia formed themselves into a confederacy, and built the city of Megalopolis. This policy was at first successful, but in a few years the confederacy began itself to strive after the supremacy, and joined themselves with this object to the Spartans. Epaminondas then invaded the Peloponnesus, but although the Thebans totally defeated the Spartans and Arcadians in the battle of Mantinea (362), yet the victory being won with the loss of their great general, the Thebans could no longer boast with justice of supremacy in Greece. Pelopidas had died two years before.

Two years after the death of Epaminondas, Philip, the father of Alexander the Great, became king of Macedonia. He was a man of great ability as a soldier and a ruler, an admirer of the Greek character, and a lover of Greek art and literature. He perceived, however, the weakness of the Greeks, arising from their want of unity, and waited for an opportunity of interfering in the affairs of their country, with the view of ultimately making himself master of it. An occasion for interference was furnished him by the Sacred war (355-46). The Phocians having taken possession of some of the land belonging to the sanctuary of Delphi, the Amphictyonic League condemned them to pay a fine and restore the land they had taken. This was refused and the league imposed upon the Thebans the task of forcing the Phocians to submit, but in their rocky strongholds the Phocians were able to resist all the efforts of their assailants, who at last called in the aid of Philip of Macedon. With his help the Phocians were subdued, they themselves expelled from the league, and their place given to Philip.

It was not, however, till the Locrian war (339-8) that Philip acquired a firm hold in Greece. The Locrians had committed the same offense as that of the Phocians, and when they likewise refused to pay the fine imposed upon them by the league, Philip, as one of the members, received the charge of punishing them. The advance of Philip was at first witnessed with comparative indifference by the states of Greece, but when his real designs became apparent the Athenians, on the advice of Demosthenes, hastily concluded an alliance with the Thebans, and an army was sent out to oppose

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him. The battle of Chæronea (338) turned out, however, disastrously for the Greeks, who saw their whole country laid at the feet of Philip. But the conqueror treated his new subjects with mildness, wishing to reconcile them to the Macedonian yoke, and to win their co-operation in his projected invasion of the rotten empire of Persia. He collected a large army, of which he got himself declared commander-in-chief by the Amphictyonic League in an assembly held at Corinth in 337 B.C.; before he was able to start he was assassinated 336 B.C.

The design of Philip on Persia was taken up and carried out by his son Alexander the Great, during whose absence Antipater was left behind as governor of Macedonia and Greece. Soon after the departure of Alexander, Agis III. of Sparta headed a rising against Antipater. He was defeated, however, in the battle of Megalopolis in 330 B.C., and no other attempt was made by the Greeks to recover their liberty for nearly 100 years. At the close of the wars which followed the death of Alexander, and which resulted in the division of his empire, Greece remained with Macedonia.

The last efforts of the Greeks to recover their independence proceeded from the Achæans, who held the northern strip of the Peloponnesus. This tribe is frequently mentioned by Homer as taking a very prominent part in the Trojan war; but during the historical period of Greece they for the most part kept aloof from the quarrels of the other states, and did not even furnish assistance in repelling the Persian invasion. They had taken part, though reluctantly, in the Peloponnesian war on the side of Sparta, and had shared in the defeat of Megalopolis in 330 B.C. In the course of the first half of the 3d century B.C. several of the Achæan towns expelled the Macedonians, and revived an ancient confederacy, which was now known as the Achæan League. About the middle of this century the league was joined by the town of Sicyon, the native city of Aratus, who soon after became its leading spirit. Through his influence it was joined also by Corinth, and then it began to aim at acquiring the supremacy throughout the Peloponnesus, and even throughout the whole of Greece, as well as at delivering Greece from the Macedonian yoke. In following out the first of these aims Aratus and the league came into collision with Sparta, which at that time happened to be governed in near succession by two kings, Agis IV. (244-240) and Cleomenes (236-220), who had both something of the old Lyncurgan spirit in them. These, then, naturally looked with jealousy on the efforts of Aratus, and during the reign of Cleomenes a war broke out between Sparta and the Achæan League. The league was at first worsted, and was only finally successful when Aratus, forgetting the ultimate end of his efforts in the pursuit of that which he had more immediately in view, called in the aid of the Macedonians. In the battle of Sellasia, in 222 B.C., Cleomenes was defeated and compelled to take to flight, and the Macedonians became masters of Sparta. Aratus died in 213, and his place was taken by Philopœmen, "the last of the Greeks," who roused the league once more to vigorous efforts, and gradually succeeded in making it in some degree independent of Macedonia.

About this time the Romans, who had just come out victorious from a second war with

Carthage, in which they had had to contend with Hannibal, found an occasion to interfere in the affairs of Greece. Philip V. of Macedon had allied himself during this war with Hannibal, and, accordingly as soon as the war was concluded, the Romans sent over Flamininus to punish him for so doing, and in this war with Philip the Romans were joined by the Achæan League. Philip was defeated at the battle of Cynoscephalæ in 197 B.C., and was in consequence obliged to agree to a peace, in which he recognized the independence of Greece. To gratify the Greek vanity Flamininus proclaimed the deliverance of Greece from the Macedonian yoke at a celebration of the Isthmian games in 196 B.C.; but the Greeks soon felt that they had only exchanged masters, that they were in reality, although not in name, as much in subjection to them as they had ever been to the Macedonians. On this account the Ætolians, who had formed a league similar to that of the Achæans, appealed for assistance against the Romans to Antiochus the Great, king of Syria, one of the kingdoms which had been formed out of the empire of Alexander. The appeal was listened to; but the help afforded was useless, for Antiochus was defeated in a bloody battle at Magnesia in Asia Minor in 190 B.C. The Ætolians were compelled to pay a money indemnity, and to sacrifice some of their art treasures.

By this time the Achæan League was unquestionably supreme over all other powers within Greece, having been joined by all the states of the Peloponnesus. But the league itself was in reality subject to Rome, the senate of which assumed the right of regulating its proceedings; and on one occasion, in 168 B.C., on the conclusion of a war waged by the Romans against Macedonia, the former carried off into Italy 1,000 of the noblest Achæans, on the pretext that they had furnished assistance to the Macedonians. Such was the condition of affairs until 147 B.C., when the league openly resisted a demand made by the Roman senate, that Sparta, Corinth, Argos, and other cities, should be separated from it, in consequence of which a war ensued, which was concluded in 146 B.C. by the capture of Corinth by the rude consul Mummius.

The independence of Greece was virtually gone with the fall of Corinth. From this date the prosperity of her cities rapidly declined, and the last sparks of the ancient Greek patriotism and love of independence became extinguished. The various cities still retained, however, something of the qualities for which they had been remarkable at the height of their glory. Athens was still one of the centres of culture, and the cradle of all kinds of new speculations. Many Athenians left their native city and made a livelihood, although they gained little esteem, among the Romans, as artists and scholars, actors and dancers, poets and wits. The citizens of Sparta continued to gratify their thirst for warfare as well as their covetousness by serving as mercenaries in foreign armies. Corinth was still the home of luxury and vice.

From the date above mentioned Greece remained attached to the Roman empire. On the division of the Roman empire it fell of course to the eastern or Byzantine half. From 1204 to 1261 it formed a part of the Latin Empire of the East, and was divided into a number of feudal principalities. In the latter year it was re-annexed to the Byzantine empire, with which

it remained till it was conquered by the Turks between 1460 and 1473. In 1699 the Morea was ceded to the Venetians, but was recovered by the Turks in 1715. (For the history of the present kingdom of Greece, see GREECE, MODERN.) Consult: Thirlwall, 'History of Greece'; Grote, 'History of Greece'; Bury, History of Greece' (1900).

Cosmogony and Religion.—Nowhere did polytheism develop itself into a brighter and more beautiful system than among the ancient Greeks. It was this circumstance no doubt that led the Romans, when they became acquainted with the literature and religion of the Greeks, to blend the Greek system with that of the ancient Italians, identifying the Greek deities with those of their own pantheon. In this way the Greek and Italian deities came to be confounded.

According to the view of the origin of all things which in course of time grew up among the Greeks, the universe was in the beginning a formless mass, Chaos (confusion), from which arose the "broad-bosomed" Earth (Greek, *Gaia*, *Gê*; Latin, *Tellus*), the Lower World (Tartarus), the darkness of Night (Greek, *Nux*; Latin, *Nox*), the parent of Light, and the formative principle of Love (Greek, *Erôs*; Latin, *Amor*), all of which were regarded as independent divinities. From the womb of the Earth proceeded the Heaven (Greek *Oouranos*; Latin, *Cælum*) and the Ocean, and afterward the Titans, creatures of superhuman size and strength, who formed the first dynasty of gods. The Titans were succeeded by a more genial race of divinities endowed with intellectual as well as physical qualities, who subdued the Titans, and subsequently the Giants, another race whom the Earth produced after the loss of her first brood. In this second dynasty of gods the supreme ruler was Zeus (Jupiter or Juppiter), the son of Kronos (Saturn), who after the subjugation of the Titans and Giants ruled in Olympus over "the middle air," while his brother Pluto reigned over the dark kingdom of the lower world (Hades, Tartarus, Orcus), and Poseidôn (Neptune), armed with his trident, ruled in the sea. Like reverence was paid to Hêra (Juno), the sister and wife of Zeus, and the queen of Heaven, the virgin Pallas Athênê (Minerva), a goddess armed with helmet and shield, and worshipped as the patroness of all intellectual employments and useful inventions, to the two children of Lêtô (Latona), Apollo, the leader of the Muses (hence called Musagêtês) and the protector of the fine arts, and his sister, the chaste huntress Artemis (Diana), the goddess of the moon, to the daughter of Zeus, Aphroditê (Venus), the goddess of love, Ares (Mars), the god of war, Hermês (Mercury), the herald of the gods, and others besides. In addition to these there was an innumerable host of inferior deities (Nymphs, Nereids, Tritons, Horai, Sirens, Dryads and Hamadryads, etc.), who presided over woods and mountains, fields and meadows, rivers and lakes, the seasons, etc. There was also a race of heroes or demigods (Heracles or Hercules, Perseus, etc.) tracing their origin from Zeus, and forming a connecting link between gods and men, while on the other hand the Satyrs formed a connecting link between the race of men and the lower animals. According to a plausible theory, now less generally held than formerly, these gods and demigods are nothing

else than the personified objects of nature (the Sky or Upper Air, the Sun, the Ocean, the Air in Motion, etc.), and were originally not conceived as personified, in the strict sense of the term, that is, as clothed in a human form, but simply as the objects themselves, to which the earliest races everywhere attributed a conscious existence like their own, and that the mythological tales relating to these deities and heroes were in their simplest form the natural expression of what human beings in their infancy believed to be done and felt by the very things which they saw. Such is the theory of Max Müller, Mr. Cox, and others; but it will be more appropriately expounded in the article Mythology (q.v.).

With regard to the inculcation of religious beliefs, and the practice of religious duties among the Greeks, the most striking thing to remember is that they had no separate class appointed to perform these functions. The priests were in no sense preachers of doctrines, but merely hierophants, or exhibitors of sacred things, of rites, symbols, and images. They showed how the gods were to be worshipped, or more usually how a particular god was to be worshipped; but it was not their office to teach theological doctrine.

Greek Language and Writing.—The language which we call Greek belongs, as is well known, to the Indo-European or Aryan family of tongues, being akin to the Sanskrit, Persian, Latin, Celtic, Slavonic, and Germanic languages, including of course English. Out of Greece it was spoken in a great part of Asia Minor, of the south of Italy and Sicily, and in other regions which were settled by Grecian colonies. From the great number of Hellenic tribes of the same race it was to be expected that there would be different dialects, the knowledge of which is the more necessary for becoming acquainted with the Greek language, since the writers of this nation have transmitted the peculiarities of the different dialects in the use of single letters, words, forms, terminations, and expressions, and that not merely to characterize more particularly an individual represented as speaking, but even when they speak in their own person. It is customary to distinguish three leading dialects, according to the three leading branches of the Greeks, the Æolic, the Doric, and the Ionic, to which was afterward added the mixed Attic dialect; besides these there are several secondary dialects. Akin to the Ionic is the so-called Epic dialect, that in which the poems of Homer and Hesiod are written, and which was afterward adopted by other epic writers. The Doric was rustic and harsh; the Ionic was the softest and most liquid. The Attic was the neatest, clearest and most precise in sound literature and idiom. The Æolic was spoken on the north of the Isthmus of Corinth (except in Megara, Attica, and Doris), in the Æolian colonies of Asia Minor, and on some of the northern islands of the Ægean Sea. The Doric was spoken in the Peloponnesus, in the Doric Tetrapolis, in the Doric colonies of Asia Minor, of Lower Italy (Tarentum), of Sicily (Syracuse, Agrigentum), and most purely by the Messenians; the Ionic in the Ionian colonies of Asia Minor, and on the islands of the Archipelago; and the Attic in Attica. In each of these dialects there are celebrated authors. The Ionic dialect is found pure

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in some prose writers, especially Herodotus and Hippocrates. The Doric is used in the poems of Pindar, Theocritus, Bion, and Moschus. Little Doric prose remains, and that is mostly on mathematical or philosophical subjects. In Æolic we have fragments of Alcæus and Sappho. After Athens had obtained the supremacy of Greece, and rendered itself the centre of all literary cultivation, the masterpieces of Æschylus, Sophocles, Euripides, Aristophanes, Thucydides, Xenophon, Plato, Aristotle, Isocrates, Demosthenes, etc., made the Attic the common dialect of literature. Grammarians afterward distinguished the genuine Attic, as it exists in those masters from the Attic of common life, calling the latter the *common Greek* or *Hellenic* dialect; and even the later Attic writers, posterior to the golden age of the literature, were designated *Hellenes* or *common Greeks*. In this latter class are Theophrastus, Apollodorus, Polybius, Plutarch, and others. Many of the later writers, however, wrote genuine Attic, as Lucian, Ælian, and Arrian. Except the dramatists, the poets by no means confined themselves to the Attic; the dramatists themselves assumed the Doric, to a certain degree, in their choruses, for the sake of giving them additional solemnity, because the antique ode was of Doric tradition. They also used the epic or Æolic dialect in narrative passages of the drama where it recalled the recitations of the ancient Ionian rhapsode. Undoubtedly the Greek dialects were not, in the earliest times, so distinct from each other as they afterward became; and on this subject we may quote the words of Prof. Bury (*Hist. of Greece*, chap. i): "There can be little doubt that the mixture of the Greeks with the native peoples had a decisive effect upon the differentiation of the Greek dialects. The dialects spoken by the first settlers in Thessaly, in Attica, in Arcadia, have some common characteristics which tempt us to mark them as a group, and distinguish them from another set of dialects spoken by Greek folks which were to appear somewhat later on the stage of history. We may conjecture that the first set of invaders spoke in their old home much the same idiom; that this was differently modified in Thessaly and Boeotia, in Attica and Argolis, and the various countries where they settled; and that many of the local peculiarities were developed in the mouths of the conquered learning the tongue of the conquerors." It results that to have a thorough knowledge of the Greek language we must follow out historically as far as possible the course of its formation, extending our view over all the varied forms of the dialects—a labor which this language, so rich in classic models of every kind, so perfect, so flexible, so expressive, so sweet in its sound, so harmonious in its movements, and so philosophical in its grammatical forms and whole structure, merits, and richly rewards.

When the Greeks became acquainted with the art of writing we do not know. In Egypt hieroglyphics were used more than 3,000 years before the Christian era, and the cuneiform writing of Assyria and Babylonia had a similar antiquity. In Crete writing was practised more than 2,000 years before Christ, it is believed, and among the Asiatic Greeks it was probably introduced 9 or 10 centuries before Christ. According to the writer above quoted: "Perhaps the earliest example of a Greek writing that we possess is

on an Attic jar of the 7th century; it says the jar shall be the prize of the dancer who dances more gaily than all the others. But the lack of early inscriptions is what we should expect. The new art was used for ordinary and literary purposes long before it was employed for official records. It was the great gift, which the Semites, who themselves derived it from Egypt, gave to Europe." According to the legend it was Cadmus the Phœnician who introduced the alphabet into Greece; and it is an undoubted fact that the most of the Greek letters are derived from the Phœnician ones. The Greek alphabet possesses the following 24 letters: Α, α (alpha), a; Β β (beta), b; Γ γ (gamma), g; Δ δ (delta), d; Ε ε (epsilon), ē; Ζ ζ (zeta), z; Η η (eta), ē; Θ θ (theta), th; Ι ι (iota), i; Κ κ (kappa), k; Λ λ (lambda), l; Μ μ (mu), m; Ν ν (nu), n; Ξ ξ (xi), x; Ο ο (omicron, i. e. small o), ō; Π π (pi), p; Ρ ρ (rho), r; Σ σ, ς (sigma), s; Τ τ (tau), t; Υ υ (upsilon), u, commonly transliterated by y; Φ φ (phi), ph; Χ χ (chi), ch guttural; Ψ ψ (psi), ps; Ω ω (omega, or great o), ō. There are also marks indicating accent, a rough and a smooth "breathing," the former equivalent to *h* initial before a vowel; but no *j*, *v*, *w*, etc. The alphabet originally introduced into Greece is said to have consisted of but 16 letters; 4 (Θ Ξ Φ Χ) are said to have been invented by Palamedes during the Trojan war, and 4 more (Ζ Η Ω Ψ) by Simonides of Ceos. That the 8 letters mentioned are more modern than the others is certain, partly from historical accounts, partly from the most ancient inscriptions. It remains to remark that the Greeks originally wrote from right to left; then *boustrophedon*, that is, alternately from right to left and left to right; and finally always from left to right.

Greek Literature.—The origin of Greek literature, that is, of the intellectual cultivation of the Greeks as contained in written works, is lost in an almost impenetrable obscurity. Though there existed in Greece, in earlier times, no actual literature, there probably was by no means a want of what we may not improperly call *literary cultivation*, if we free ourselves from the prejudice that a literature must of necessity be embodied in written alphabetical characters. The first period of Grecian cultivation which extends to the movement known as the invasion of the Peloponnesus by the Heraclidæ and Dorians, and the great changes produced by it, and which we may designate by the name of the *Ante-Homeric period*, was no doubt utterly destitute of literature; but it may be questioned whether it was also destitute of all that culture which we are accustomed to call *literary*. The fables which are told of the intellectual achievements of this period may have a certain basis of truth. Among the promoters of literary cultivation in this time we must distinguish three classes: (1) Those of whom we have no writings, but who are mentioned as inventors of arts, poets, and sages: Amphion, Demodocus, Melampus, Olen, Phœmius, and Prometheus. (2) Those to whom are falsely attributed works no longer extant: Abaris, Aristæas, Chiron, Epimenides, Eumolpus, Corinnus, Linus, and Palamedes. (3) Those to whom writings yet extant, which, however, were productions of later times, are attributed: Dares, Dictys, Horapollon, Musæus, Orpheus, and the authors of the

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Sibylline oracles. This is not the place to inquire whether any and how much of these writings is genuine. It is enough that the idea of such a forgery proves a belief in the existence of earlier productions. And how could the next period have been what it was without previous preparation? If we may thus infer what must have been in order that the succeeding period should be what it was, we learn also from the various traditions of the Ante-Homeric period that there existed in it institutions which, through the means of religion, poetry, oracles, and mysteries, had no small influence on the civilization of the nation and the promotion of culture; for the most part, indeed, in Oriental forms, and perhaps of Oriental origin; and that these institutions, generally of a priestly character, obtained principally in the northern parts of Greece, Thrace, and Macedonia. We must here remark that intellectual cultivation did not prosper at once in Greece, nor display itself simultaneously among all the tribes; that the Greeks became Greeks only in the process of time, and some tribes made more rapid progress than others.

About 80 years after the Trojan war new commotions and a new migration began within the borders of Greece. A portion of the inhabitants emigrated from the mother country to the islands and to Asia Minor. This change was in the highest degree favorable to Grecian genius; for the new settlements, abounding in harbors, and destined by nature for commerce and industry, afforded them not only a more tranquil life, but also a wider field for refinement, and gave rise to new modes of life. The ancients ascribed to the colonies in Ionia and the rest of Asia Minor the character of luxury and voluptuousness. The blue sea, the pure sky, the balmy air, the beautiful prospects, the finest fruits, and most delicious vegetables in abundance, all the requisites of luxury, here united to nourish a soft sensuality. Poetry and philosophy, painting and statuary, here attained their highest perfection; but great and heroic deeds were oftener celebrated than performed. Near the scene of the first grand national enterprise of the Greeks—the Trojan war—it was not strange that the interest this event excited should be lively, and that it should take a powerful hold of the imagination. Poetry thus found a subject, in the treatment of which it necessarily assumed a character entirely distinct from that of the former period. Among all nations heroic poetry has flourished with the spirit of heroism. The heroes were here followed by the bards, and thus the epopee was formed. We therefore call this *second period* the *epic age* of the Greeks. The minstrel (*aoidos*) now appears separated from the priest, but highly honored, particularly because the memory of the heroes lived in his verse; and poetry was the guardian of all the knowledge of preceding times, so long as traditions were not committed to writing. From its very nature the epopee must be historical, in an enlarged sense. Under such circumstances it is not strange that regular schools for poets were established; for the imagination of the first poet fired the imagination of others, and it was then, perhaps, believed that poetry must be learned like other arts—a belief to which the schools for priests, on which the schools for minstrels were probably modeled, contributed

not a little. But they were minstrels in the strictest sense, for their traditions were sung, and the poet accompanied his verses on a stringed instrument. On every important occasion minstrels were present, who were regarded as standing under the immediate influence of the gods, especially of the Muses, who were acquainted with the present, the past, and the future. The minstrel, with the seer, thus stood at the head of men. But among the many minstrels which this age undoubtedly possessed, Homer alone has survived, whose name has always been associated with the two great epic poems, the 'Iliad' and 'Odyssey,' although in modern times the theory first promulgated by Wolf in 1795, that neither of these poems is the work of one man, has been accepted either entirely or with modifications by many scholars, and many others who contend for the unity of each of the two poems are yet inclined to believe that they were not both composed by the same individual. The latter opinion is not of modern origin, but divided also the Homeric scholars of ancient times. Several hymns, and a mock heroic poem called the 'Batrachomyomachia,' or the 'Battle of the Frogs and Mice,' are also ascribed to Homer, but on altogether insufficient grounds. From him an Ionian school of minstrels takes its name—the *Homeridae*—who probably constituted at first, at Chios, a distinct family of rhapsodists, and who preserved the old Homeric and epic style, the spirit and tone of the Homeric verse. Much that was attributed to Homer may reasonably be assigned to them. A certain class of the followers of Homer are known by the name of the *Cyclic poets*, who began, however, to deviate materially from the Ionian epos, the historical element predominating more and more over the poetical. By *Cyclius* we understand the whole circle of traditions and fables, and not merely the events of the Trojan war. Cyclic poetry comprehended the whole compass of mythology; and we may, therefore, divide it into: (1) a cosmogonical; (2) a genealogical; and (3) a heroic *Cyclius*; in the latter of which there are two separate periods: (1) that of the heroes before; and (2) that of those after, the expedition of the Argonauts. To the first class belong the battles of the Titans and giants; to the second, the theogonies and herogonies. To the first period of the third class belong the Europia, several Heracleia and Dionysiads, several Thebais, Argonautics, Theseids, Danaids, Amazonica, etc. In the second period the poetry generally related to the Trojan war. To this belonged the *Nostoi*, which treated of the return of the heroes from Troy. The earliest of these Cyclic poets appeared about the time of the first Olympiad. A history of the gradual formation of their poetry cannot be given, because we have only very general accounts respecting them. But what we do know justifies us in concluding that between these historic poets and the Ionian school of minstrelsy something intervened, making, as it were, the transition. And we actually find this in the *Bæotian-Ascrean* school, which arose in European Greece, it is said, in the 8th century B.C. It derived its name from Ascrea in Bæotia, the residence of Hesiod, who stood at its head, and by whom poetry was probably conducted back again from Asia Minor (for he was originally of Cyme in Æolia) to Greece. His

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works also were at first preserved by rhapsodists. They were not arranged till a later period, when they were augmented by foreign additions; so that, in their present form, their authenticity is as doubtful as that of the poems ascribed to Homer. Of the 16 works attributed to him there have come down to us the 'Theogony,' the 'Shield of Hercules' (the fragment of a larger poem), and 'Works and Days' (a didactic work on agriculture), the 'Choice of Days,' intermixed with moral and prudential maxims, etc. The works of Homer and Hesiod acquired a canonical importance among the Greeks, and constituted, in a certain degree, the foundation of youthful education.

In the *third period*, the age of lyric poetry, of apologues and philosophy, our knowledge of Greek history gradually acquires a greater certainty. About the beginning of the epoch of the Olympiads (776 B.C.) there ensued a true ebb and flood of constitutions among the small states of Greece. After numerous vicissitudes of power, during which the contending parties persecuted each other for a long time with mutual hatred, republics, with democratical constitutions, finally sprang up, which were in some measure united into one whole by national meetings at the sacred games. The spirit prevalent in such a time greatly favored lyric poetry, which now became an art in Greece, and reached the summit of its perfection at the time of the invasion of the Persians. Next to the gods, who were celebrated at their festivals with hymns, their country, with its heroes, was the leading subject of this branch of poetry, on the character of which external circumstances seem to have exercised no slight influence. The mental energies of the nation were roused by the circumstances of the country; and the numerous wars and conflicts, patriotism, the love of freedom, and the hatred of enemies and tyrants, gave birth to the heroic ode. Life, however, was at the same time viewed more on its dark side. Thence there was an intermingling of more sensibility in the elegy, as well as, on the other side, a vigorous reaction, in which the spirit of ridicule gave rise to the iambus (satire). In everything there was a more powerful impulse toward meditation, investigation, and labor for the attainment of a desired condition. The Golden Age, the gift of the gods, was felt to have departed. Whatever man discovered in future was to be the fruit of his own efforts. This feeling showed that the age of manhood had arrived. Philosophy had become necessary, and attained continually a greater development. It first spoke in maxims and gnomes, in fables and in dogmatic precepts. Lyric poetry next gave utterance to the feelings excited by the pleasures of earth. Of those who gained a reputation in this way, as well as by the improvement of music and the invention of various forms of lyric poetry, history presents us the names of Archilochus of Paros, inventor of the iambus; Tyrteus, author of war songs; Callinus of Ephesus, inventor of the elegiac measure (all of whom flourished in the 7th century B.C.); Terpander of Antissa, in Lesbos (675 B.C.); Simonides of Amorgos (664), the second of the three principal iambic poets of Greece; Alcman the Lydian, and Arion of Methymna, said by Herodotus to have invented the dithyrambus (both flourished about 630 B.C.); Sappho, Alcaeus, and Erinna, all natives of Lesbos, the first

two of Mitylene, and all of whom flourished about 610 B.C.; Minnermus of Colophon (flourished from about 634 to 600 B.C.); Stesichorus of Himera (600); Ibycus of Rhegium (lived about 540 B.C. at the court of Polycrates of Samos); Anacreon of Teos (lived first at the court of Polycrates, afterward at that of Hipparchus at Athens); Hipponax of Ephesus (540-520), the third great iambic poet; Lasus of Hermione (520); Simonides of Ceos (fl. 500); his contemporary, Timocreon of Rhodes; Corinna of Tanagra (490), the friend and instructress of Pindar (522-442). As gnomic writers, Theognis of Megara and Phocylides of Miletus deserve to be named (both of whom flourished about 540 B.C.); as a fabulist, Æsop (570 B.C.). In the order of time several belong to the following period, but are properly placed here, on account of their connection.

In the period of 550-500 B.C. traditions were first committed to writing in prose, and Cadmus of Miletus (540), Acusilaus the Argive, Hecataeus of Miletus (500), Hellanicus of Mitylene, and Pherceydes of Scyros, are among the oldest historical writers (450). These are known as the logographers (*logographoi*), a name given to them by Thucydides. After them appeared Herodotus (born 484), the Homer of history. His example kindled Thucydides (born 471) to emulation, and his eight books of the history of the Peloponnesian war make him the first philosophical historian, and a model for all his successors. If his conciseness sometimes renders Thucydides obscure, in Xenophon (born about 444), on the contrary, there prevails the greatest perspicuity; and he became the model of quiet, unostentatious historical writing. These three historians are the most distinguished of this period, in which we must, moreover, mention Ctesias (400), Philistus (363), and Theopompus (340).

An entirely new species of poetry was created in this period. From the thanksgiving festivals, which the country people solemnized after the vintage, in honor of Dionysus (Bacchus), with wild songs and comic dances, arose, especially in Attica, the drama. By degrees variety and a degree of art were given to the songs of the village chorus, and by and by an intermediate speaker was introduced, who related popular fables, while the chorus varied the eternal praises of Bacchus by moral reflections, as the narration prompted. These games of the feast of the vintage were soon repeated on other days. Solon's contemporary, Thespis, who smeared his actors, like vintagers, with lees of wine, exhibited at the cross ways or in the villages, on movable stages, stories sometimes serious with solemn choruses, sometimes laughable with dances, in which satyrs and other ridiculous characters excited laughter. Their representations were called tragedies (*tragœdiai*), that is, songs of the goat (so called either because the exhibition of a tragedy was in the earliest times accompanied by the sacrifice of a goat, or because a goat was the prize, or because the actors were clad in goat-skins) comedies (*kômœdiai*, meaning either village songs, from *kômê*, a village, or songs of revelry, from *kômos*, revelry), festive dances and satirical actions (*drama satyricum*). These sports were finally exhibited, with much more splendor, on the stages of the towns, and acquired a more and more distinct character by their peculiar tone

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and morality. Instead of an intermediate speaker, who related his story extemporaneously, Æschylus (525-456) first substituted actors, who repeated their parts by rote; and he was thus the actual creator of the dramatic art, which was soon carried to perfection; tragedy by Æschylus, Sophocles (495-406) and Euripides (480-406); comedy by Cratinus (519-422), Eupolis (fl. 449), Crates, but especially by Aristophanes (about 444-380). Under the government of the Thirty Tyrants the freedom which comedy had possessed, of holding up living characters to ridicule, was restricted, and the middle comedy was thus gradually formed, in which the chorus was abolished, and, with delineations of general character, characteristic masks were also introduced. The mimes of Sophron of Syracuse (460-420), dramatic dialogues in rhythmical prose, formed a distinct species, in connection with which stands the Sicilian comedy of Epicharmus (about 540-450).

Eloquence, the necessary outcome of the democratic institutions of many of the Greek states, likewise flourished during this period, and was speedily elevated to the rank of a fine art. Antiphon (440), Lysias (458-378), Isocrates (436-338), Iseus (420-348), Demosthenes (about 385-322), Æschines (389-314), were renowned masters of this art. We still possess the admired masterpieces of several of these orators. How near rhetoric was then to triumphing over poetry is manifested in Euripides, and there is no question that it had a considerable influence on Plato and Thucydides. Mathematics was now cultivated, and geography served to illustrate history. Astronomy is indebted to the Ionic school, arithmetic to the Italic, and geometry to the Academic school for many discoveries. As mathematicians, Meton, Euctemon, Archytas of Tarentum, Eudoxus of Cnidus, were celebrated. Geography was particularly enriched by voyages of discovery, which were occasioned by commerce; and in this view Hanno's voyage to the western coast of Africa, the Periplus of Scylax (a description of the coasts of the Mediterranean), and the discoveries of Pytheas of Massilia in the northwest of Europe, deserve mention. The study of nature was likewise pursued by the philosophers; but the healing art, hitherto practised by the Asclepiadæ in the temples, constituted a distinct science, and Hippocrates (about 460-357) became the creator of scientific medicine.

The following period is usually called the *Alexandrine*, and might be characterized as the *systematizing* or *critical period*. Athens did not, indeed, cease to sustain its ancient reputation; but during the greater part of the period Alexandria was in reality the leading Greek city. From this and other causes the spirit of Grecian literature necessarily took another turn. Greece was now under a foreign yoke; great creative geniuses no longer arose either in the home country or in the colonies; and the use of an immense library tended to make erudition triumph over the free action of mind, which, however, could not be immediately overborne. In philosophy, Plato's acute and learned disciple, Aristotle (384-322), appeared as the founder of the Peripatetic school, which gained distinction by enlarging the territory of philosophy, and by its spirit of system. He separated logic and rhetoric, ethics and politics, physics and meta-

physics, and applied philosophy to several branches of knowledge; thereby producing economics, pedagogics, and poetics. He invented the philosophical syllogism, and gave philosophy the form which it preserved for centuries. His disciple Theophrastus (died 287 B.C.) followed his steps in the investigation of philosophy and natural history. But the more dogmatic was the philosophy of Aristotle, the more caution was requisite to the philosophical inquirer, and the spirit of doubt was salutary. This was particularly exhibited in the system of skepticism which originated with Pyrrho of Elis (330). A similar spirit subsisted in the middle and new academics, of which Arcesilaus (241) and Carneades (155) were the founders. The Stoic school, founded by Zeno of Citium in Cyprus (342-270), and the Epicurean, of which Epicurus (299-279) was the founder, were chiefly remarkable for the effect that they had in the development of moral speculation in opposite directions, which gradually brought about a great difference in the practice of the adherents of the opposite schools. Mathematics and astronomy made great progress in the schools at Alexandria, Rhodes, and Pergamum. And to whom are the names of Euclid (323-283), Archimedes (287-212), Eratosthenes (276-196), and Hipparchus (160-145) unknown? The expeditions and achievements of Alexander furnished abundant matter to history; but, on the whole, it gained in extent, not in value, since a preference for the wonderful over the actual had now become prevalent. The more gratifying, therefore, is the appearance of Polybius of Megalopolis (204-122), who is to be regarded as the author of the true method of historical exposition, by which universal history acquired a philosophical spirit and a worthy object. Geography, which Eratosthenes made a science, and Hipparchus united more closely with mathematics, was enriched in various ways. To the knowledge of countries and nations much was added by the accounts of Nearchus Agatharchides and others. With respect to poetry many remarkable changes occurred. In Athens the middle comedy gave place not without the intervention of political causes to the new which approaches to the modern "comedy of manners." (See DRAMA.) Among the many poets of this class Menander (342-291) and Philemon (330) were eminent. To this period also belong the celebrated idyllic poets Theocritus (270), and his contemporary Bion, as well as Moschus, who lived about 20 years later. The other kinds of poetry did not remain uncultivated; we may mention the learned poetry of Callimachus and of Lycophron, the epic of Apollonius Rhodius, the didactic of Aratus and Nicander; but all these labors, as well as the criticisms of poetry and the fine arts, point to Alexandria; and we shall therefore pass them over in this place. (See ALEXANDRIAN SCHOOL.) The Septuagint (q.v.) or Greek translation of the Old Testament was a work of scholars of the Alexandrian school. The period subsequent to 146 B.C. is known as the Græco-Roman. Polybius may be placed here as well as the other historians, Diodorus Siculus and Dionysius of Halicarnassus; while in the Christian era we have Josephus, Arrian, Appian, Herodian; the biographies of Plutarch, Diogenes Laertius, and Philostratus, the geographies of Strabo and Pausanias; the astronomy and geography of Ptolemy;

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the informative works of Athenæus, Ælian, and Stobæus; the medical works of Galen; the satirical works of Lucian; and the Greek romances best represented in Heliodorus, Achilles Tatius, and Chariton. See **BYZANTINE LITERATURE**.

The following are among the best works on Greek literature: K. O. Müller's 'Geschichte der griechischen Litteratur' (4th ed. 1882-4); Bergk's 'Griechische Litteraturgeschichte' (1892-4); Bernhardt's 'Grundriss der griechischen Litteratur' (new ed. 1892); Mure's 'Critical History of the Language and Literature of Ancient Greece' (1854-60); Mahaffy's 'Classical Greek Literature' (1890); Jevons' 'History of Greek Literature' (1890); Croiset's 'Histoire de la littérature grécque (1889-95); Susemihl's 'Geschichte der griechischen Litteratur in der Alexandrinerzeit' (1891-2).

Greece, Modern (Greek *Hellas*), a kingdom in the southeast of Europe, bounded on the north by Turkey, and on all other sides by the sea—the Ionian Sea on the west, the Mediterranean proper on the south, and the Ægean Sea on the east. The mainland forms two chief portions, united by the narrow Isthmus of Corinth; a northern, called Northern Greece or Livadia, and a southern peninsula, called the Peloponnesus or Morea. By far the largest island is Eubœa, only separated from the mainland of Livadia by the narrow channel of Euripo. The other islands form several groups: The northern Sporades on the northeast of Eubœa including Skiathos, Skopelos, Khiliodromia, Pelagonisi, Sarakinon or Peristeri, and Skyros; the western Sporades, chiefly in the Gulf of Egina, or between it and the Gulf of Nauplia, including Hydra, Spetsæ, Poros, Egina, and Salamis or Koluri, the Cyclades; and the Ionian Islands. (See **GREECE, ANCIENT**.) The capital and largest town is Athens.

Physical Features.—See **GREECE, ANCIENT**.

Divisions.—Greece is politically divided into 16 nomarchies, which are again subdivided into eparchies, and these again into demes. The following table gives the names of the nomarchies, their area and population in 1908:

NOMARCHIES		Area in sq. m.	Pop. 1908.
Northern Greece:	Attica and Boeotia...	2,472	407,053
	Phocis and Phthiotis.	2,044	174,574
	Arcania and Ætolia	3,013	141,405
	Argolis.....	1,442	81,043
Pelopon- nesus:	Achaia and Elis.....	1,001	254,728
	Arcadia.....	2,020	162,324
	Messenia.....	1,221	127,091
	Laconia.....	1,679	61,522
	Eubœa.....	2,216	116,003
	Cyclades.....	923	130,378
Islands:	Corfu.....	431	99,571
	Zante.....	277	42,502
	Cephalonia.....	302	71,235
	Arta.....	305	41,280
	Trikkala.....	2,200	90,548
Thessaly:	Larissa.....	2,478	95,066
	Other Nomarchies...	3,658	534,029
Total.....		25,014	2,631,952

By the law of 17 July 1899 there is a new division into 26 nomarchies, namely: Attica, Boeotia, Phthiotis, Phocis, Ætolia and Acarnania, Eurytania, Larissa, Magnesia, Trikkala, Karditsa, Arta, Achaia, Elis, Eubœa, Cyclades, Kerkyra (Corfu), Leucas, Kephallenia (Cepha-

lonia), Zacynthos (Zante). These are subdivided into 69 districts and 442 communes.

Climate.—In general the first snow falls in October and the last in April. During the summer rain scarcely ever falls, and the channels of almost all the minor streams become dry. The air is then remarkably clear, and a month will sometimes pass away without a cloud being seen. A sudden change, however, takes place toward the end of harvest. Rain becomes frequent and copious; and the streams which had been dried up not only fill their channels, but frequently overflow them, and lay considerable tracts under water. In this way stagnant pools and marshes are occasionally formed, which give rise to intermittent fevers. Compare **GREECE, ANCIENT** (*Climate*).

Vegetation, Agriculture, etc.—The cultivated land in Greece has recently been estimated at rather more than 5,563,100 acres. There are besides 5,000,000 acres of pasture land, and 3,000,000 acres of waste land. The draining of Lake Copais redeems 60,000 acres of land, which the company divides into holdings of from 5 to 50 acres. English agricultural machinery is being introduced, but still agriculture is in a backward state.

Thessaly is the richest portion of Greece agriculturally. The condition of the agricultural population is said to be very satisfactory. The principal cereal crops are wheat, barley, and maize, but the quantity raised is not sufficient, and much grain is imported. All the fruits of the latitude are grown—figs, almonds, oranges, citrons, melons, etc.—in abundance and of excellent quality, without receiving any great share of attention. The vine also grows vigorously, and considerable quantities of wine are made, some of the sorts being of high quality. But a much more important product of Greece, especially on the coasts of the Peloponnesus, and in the islands of Cephalonia, Zante, Ithaca, and Santa Maura, is the Corinthian grape or currant, the export of which has increased in value from \$8,238,118 in 1900 to \$8,910,000 in 1908. Another important object of cultivation is the olive, for which both the soil and the climate are alike favorable. The culture of the mulberry for the rearing of silk-worms is carried on to some extent. Some good tobacco is grown. The forests contain, among other trees, the oak (*Quercus Ægilops*) which yields the valonia of commerce. The live stock are neither numerous nor of good breeds. The raising of artificial grasses for their maintenance may be said to be unknown, and the scanty herbage which natural pasture affords must be of little avail. Asses and mules are more numerous than horses; cattle are comparatively few; and the chief animals from which dairy produce is obtained are the sheep and the goat. The quantity of wool produced is considerable, but most of it is of a coarse description.

Manufactures, Trade, Communications, etc.—The manufactures are limited, but with all other branches of industry in Greece are increasing, and are furthered by high duties on imported goods. The employment of the steam-engine in manufacturing industries dates from about 1868, and is yet only developed to a small extent. Piræus is the chief industrial centre, having spinning and weaving factories for cotton, silk, and wool, machine-shops, paper-works, dye-works, etc. Other centres are Syra, Coriath,

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Nauplia, Patras, Larissa. Still, cottons and other textiles form by far the most important part of the imports of manufactured goods. Leather manufactures form an important branch of industry. Marble has been worked from the most ancient period in the quarries of the island of Paros. In 1871 the working of the ancient argentiferous lead mines of Laurion in Attica was resumed with good success; and quantities of manganese iron ore and zinc ore are also raised in this district. The most important branch of manufacturing industry is ship-building, which is carried on at various places. Much of the trade carried on is merely coasting, but the foreign trade also is of considerable extent. A large part of the foreign shipping of Greece is that which deals with the import of the manufactures of England, Germany, etc., into Greece, Turkey, and the Levant generally. In regard to this branch, the peculiar advantages which the Greeks possess in their knowledge of the languages, and acquaintance with the habits and wants, of the people of these countries, have been greatly in their favor. The chief ports of Greece are Piræus (population 42,169, the port of Athens), Syra, and Patras (population 37,958). The principal export is currants (very largely to Britain); but wine, olive-oil, dried figs, raisins, silver, lead, zinc ore, and manganese iron ore, tobacco, sponges, and other articles are also exported; the principal imports are cereals, coals, and cotton and woolen goods. The imports in 1901 were \$27,773,010; in 1908 the imports were \$29,733,300; the exports \$21,282,200. The greatest hindrance to the development of Greece is the want of good roads, which are peculiarly necessary in so mountainous a country. Attention, however, has been directed to the supplying of this want, and there are now over 2,043 miles of roads. Among other public works which have engaged the energies of the Greeks are the construction and restoration of harbors, the erection of lighthouses, the execution of drainage works, etc. In 1883 there were only 58 miles of railways open, but in 1906 845 miles were open, and 100 were under construction. A ship canal across the isthmus of Corinth (4 miles) was opened in 1893.

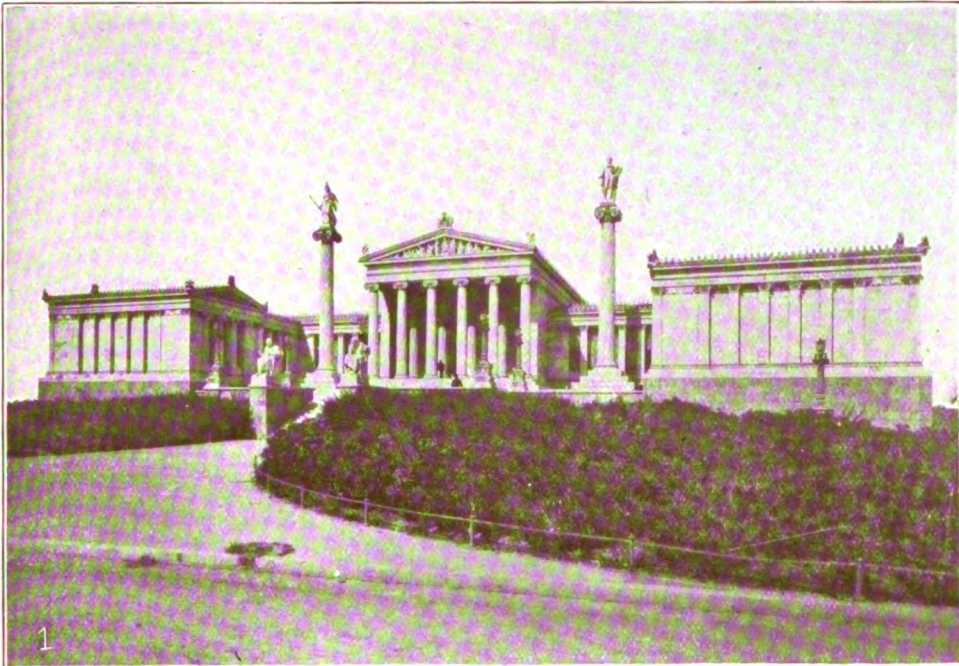
Weights, Measures, and Money.—The French metric system of weights and measures has been introduced into Greece by the government, but the people still adhere to the old system. In the latter the standard lineal measure was the *pikē*, equal to three quarters of an English yard; the standard square measure was the *stremma*, nearly equal to .242 of an English acre; the standard weight was the *oke* = 2.80 pounds avoirdupois: 44 *okes* were equal to 1 *cantar*, or about 124 pounds avoirdupois. The weights and measures of the metric system are called royal, to distinguish them from the old weights and measures. In this system the French measures of length, millimetre, centimetre, decimetre, and metre are called respectively *gramma*, *daktylos*, *palamē*, and *pēcheus* (cubit). The kilometre is called a *stadion*, and the myriametre *skoimis*. The new or royal measures of surface are the square *pēcheus* = the square metre, and the *stremma* = the are. The measures of capacity are the *kybos*, *mystron*, *kotylē*, *litra*, and *kailon*, respectively equal to the millilitre, centilitre, decilitre, litre, and hectolitre. The weights for gold, silver, and precious stones are the *kokkos*, *obolos*, and *drachmē*, respectively equal

to the centigramme, decigramme, and gramme. The commercial unit of weight is the *mina* = 1,500 *drachmēs* = 1½ kilogramme. The *talanton* is equal to the quintal, and the *tonos* equal to the tonneau.

In 1875 Greece entered the monetary league of which the other members are France, Italy, Switzerland, and Belgium, and all the members of which have a monetary unit equal to the franc in value. The name of the Greek unit is the *drachma*, divided into 100 *lepta*, nominally equal to a franc but varying considerably in value.

Government and People.—As settled by the present constitution the throne is hereditary according to the law of primogeniture in the family of King George. The king must be a member of the Greek Orthodox Church. He attains his majority at the age of 18. The legislative authority is vested in a single chamber, called the Boulē, the members of which (proportioned in number to the amount of the population) are elected for four years by ballot by manhood suffrage. It meets every year on 1 November, unless called at an earlier date for special business. The executive power is exercised by the king through a responsible ministry. The Greek Orthodox Church alone is established, but all other forms of religion enjoy toleration. The highest ecclesiastical authority, subject to the king, is vested in a permanent synod, which sits at Athens, and consists of five members appointed by the king from the highest dignitaries of the Church. There is 1 metropolitan, who has his seat at Athens, 21 archbishops, and 29 bishops, who are presented and ordained by the synod, and confirmed and invested by the king. Justice is administered, on the basis of the French civil code, by a supreme court (*Areios Pagos*), which has its seat at Athens; five higher courts, one at Athens, one at Nauplia, one at Patras, one at Larissa, and one at Corfu; and a number of courts of primary resort (*Protodokeia*), in the principal towns. The public revenue, derived chiefly from direct taxes, customs, stamps, excise, monopolies, the rent of national property, etc., was estimated for 1910 at \$26,251,204, and the expenditure at \$27,277,152. Revenue for 1902 was estimated at \$23,621,675, and expenditure at \$23,621,680. Greece has a very large public debt. In 1909 the amount of their gold debt was \$136,621,490. A considerable portion of the debt incurred in recent years has been in the way of raising loans for the making of railways. Of the foreign debt one loan is guaranteed by Great Britain, France, and Russia, which have latterly had to pay the dividends on it, and which are now accordingly heavy claimants on Greece. The payment of the interest on its public debt has long been with Greece a matter of difficulty. Every male Greek on attaining the age of 21 years is liable to military service, his term being 2 years with the colors, 10 with the reserve, 8 in the national guard, and 10 in the national guard reserve. The army in 1910 numbered about 23,000 on a peace footing, expanding easily to 50,000 in time of war. The navy in 1908 consisted of 3 armored ships, 12 torpedo-boats, besides several unprotected gun-vessels and cruisers. The population contains a considerable intermixture of foreign stocks, among which the Albanese, or Arnauts, are the most numerous; but the great

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1. The Academy at Athens.

2. The University at Athens.

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majority, though not without some taint in their blood, are of genuine Greek extraction, and, both in physical and mental features, bear a marked resemblance to their celebrated forefathers. It is true that the degrading bondage to which they were subjected for centuries has sunk them far below their natural level, and too often substituted sycophancy and low cunning for the intellectual superiority which, in earlier and better times, displayed itself in immortal productions of the chisel and the pen; but that the original elements of greatness still exist has been proved by the noble struggles which they have made for independence. The educational system of Greece, organized in 1834 by George Gennadius, one of the leaders of the war of independence, is very complete. There are three grades of schools, the demotic or primary national schools, the Hellenic or secondary grammar schools, and the gymnasia, in which, it is asserted, the range and the level of the teaching are much the same as in a German gymnasium or in the upper parts of our public schools. In all three grades of schools education is gratuitous, and in the primary schools it is compulsory on all children between 5 and 12. There is a university at Athens, attended by nearly 3,000 students, many of whom come from districts under the rule of the Sultan. Thus far, however, education seems to be actually diffused among the people only to a limited extent, though the numbers that receive a university education are so great that many such young men find themselves without any proper sphere of employment, and are obliged to adopt the career of politician and place-hunter. Many of these are now, however, said to be finding better ways of turning their education to account through the rapid development of trade and industry. The national dress of the Greeks resembles the Albanian costume. In the men it consists of a tight jacket, generally scarlet, a white linen kilt in numerous folds, a bright-colored sash round the waist, and embroidered gaiters; in the women it consists of a vest or jacket fitting close to the shape, and a skirt, on the head a kind of fez or skull-cap.

History.—From the year 1715 (see preceding article) till 1821 the Greeks were subject to the domination of the Turks. In 1770, and again in 1790, they made attempts at insurrection, which, however, were speedily frustrated. In the early years of the 19th century a secret society was formed for the purpose of effecting their liberation from the galling yoke, and in 1821 they found an opportunity of breaking out into another insurrection, which in the end proved successful. In that year Ali, the pasha of Janina, revolted against the Sultan Mahmoud II., and secured the aid of the Greeks by promising them their independence. The rising of the Greeks took place on 6 March, under Alexander Ypsilanti, and on 1 Jan. 1822 they published a declaration of independence. In the same year Ali was assassinated by the Turks, but the Greeks nevertheless continued the struggle that they had begun, and in which they were encouraged by the sympathy of nearly all the nations of Europe. Among the most distinguished of their leaders were Marcos Bozzaris, Capo d'Istria, Constantine Kanaris, Kolocotroni, Miaulis, Mavrocordato, Mavromichaelis, etc. In 1823 they were joined by Lord Byron, who, during the last year of his life, did all in his power

to further their cause by his wealth, as well as by his active efforts on their behalf. Unfortunately he died in April of the following year. In 1825, the Turks having called to their aid Mehemet-Ali, the pasha of Egypt, the latter sent his son, Ibrahim Pasha, whose talents secured them the success that they had hitherto been unable to attain. Tripolitza, the capital of the Morea, was taken, as was also Missolonghi, in spite of the valor of the Suliote mountaineers. It was about this time that the Greek patriots received the aid of the English admiral Lord Cochrane, who organized their fleet, and of the French colonel Fabvier, who instructed their army in the system of European tactics. In spite of this, however, the Turks continued to triumph everywhere, and resisted all the pressure that was put upon them by other European powers to make concessions. A treaty was then concluded at London (6 July 1827) between Britain, France, and Russia, for the pacification of Greece, and when the mediation of these three powers was declined by the Sultan, their united fleets, under Admiral Codrington, attacked and annihilated the Turkish fleet off Navarino, 20 Oct. 1827. In the beginning of the following year (1828) Count Capo d'Istria became president of the state, and later on in the same year Ibrahim Pasha was forced to evacuate Greece. At last, on 3 Feb. 1830, a protocol of the allied powers declared the independence of Greece, which was recognized by the Porte on 25 April of this year. The new member of the states of Europe received from the allies a monarchical form of government, and offered the crown to Leopold, Prince of Saxe-Coburg, and when he refused it, to Otho, a young prince of Bavaria. The latter accepted the offer, and was proclaimed king of the Hellenes at Nauplia, on 30 Aug. 1832. The power of the king was at first almost absolute, and his arbitrary measures, and more especially the preponderance which he gave to Germans in the government, soon made him unpopular. At the same time the finances of the kingdom were in a very embarrassed condition, and a general uneasiness prevailed. In 1843 a rebellion took place, after which a constitution was drawn up. But Otho was after that no more popular than before, and after the outbreak of another rebellion in February 1862, he saw himself compelled to abdicate the throne (24 October). A provisional government was then set up at Athens, and the National Assembly after declaring that the throne had been forfeited by Otho, offered it in succession to Prince Alfred, of England, and Prince William George, of Denmark. The latter accepted it, and 30 March 1863 was proclaimed as King George I. At the end of that year a constituent assembly was elected for the purpose of framing a new constitution, and the result of its labors was the constitution which is still in force. In 1864 an addition was made to the small kingdom by the annexation of the Ionian Islands, which had hitherto formed an independent republic under the protection of Britain. From the first Greece has been watching for an opportunity of extending its frontier northward, so as to include the large Greek population in Thessaly and Epirus. In January 1878, during the Russo-Turkish war, Greek troops were moved into Thessaly and Epirus to the assistance of their brethren who had risen there, but on the remonstrance of England these troops were with-

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drawn. The Treaty of Berlin made no definite provisions for any extension of Greek territory, but in 1881 Turkey had to cede about 5,000 square miles of Thessaly to Greece. After the union of eastern Roumelia with Bulgaria, in 1885, war with Turkey was only prevented by the great powers. In 1896 an insurrection of the Christians in Crete led to the interference of Greece and to war with Turkey. The Turks speedily drove back the Greeks from the northern frontier and overran Thessaly; and Greece was enabled only through the efforts of the great powers to obtain reasonable terms of peace. The recent internal political history of Greece relates mainly to her financial obligations. After the expulsion of the Turkish troops from Crete in 1898 Prince George was appointed high commissioner of the island.

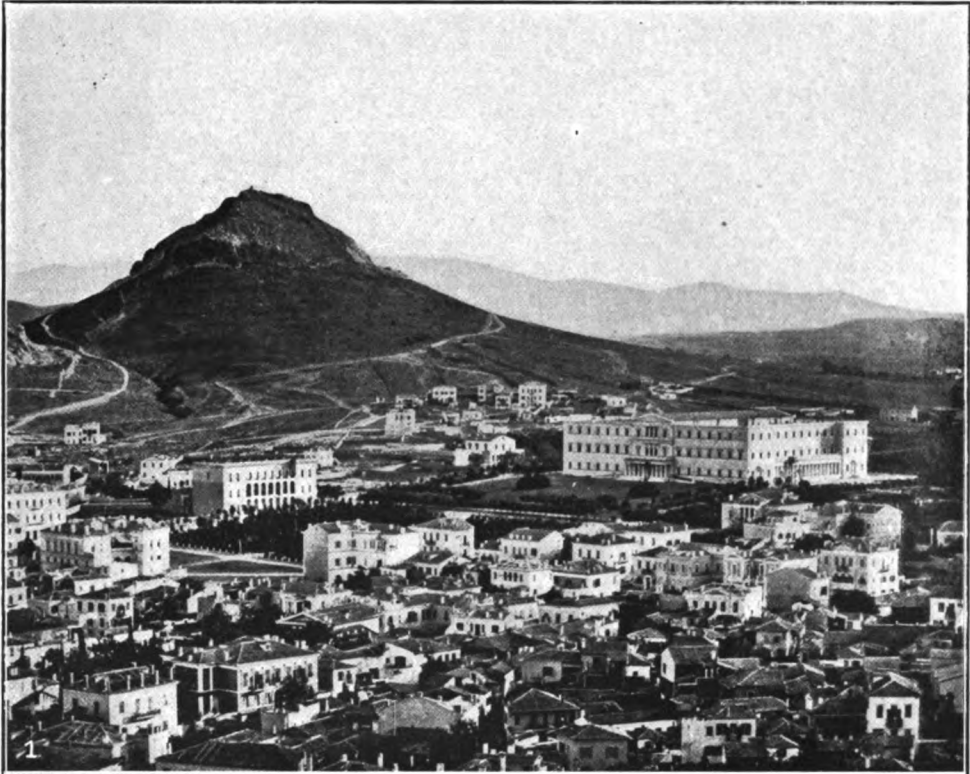
Modern Greek Language and Literature.—The Greek language seems to have preserved its purity longer than any other known to us; but a deadly blow was inflicted when the Greeks were enslaved by the fall of Constantinople (1453 A.D.). All the cultivated classes, who still retained the pure Greek, the language of the Byzantine princes, either perished in the conflict or took to flight, or courted the favor of their rude conquerors, by adopting their dialect. In the lower classes only did the common Greek survive (the *koinē, dēmōdēs, haplē, idiotikē dialektos*) the vulgar dialect of the polished classes, the traces of which occur, indeed, in earlier authors, but which first appears distinctly in the 6th century. This Greek *patois* departed still more from the purity of the written language—which took refuge at court, in the tribunals of justice, and the halls of instruction—when the Frank crusaders augmented it by their own peculiar expressions, and the barbarians in the neighborhood engrafted theirs also upon it. This popular dialect first appears as a complete written language in the chronicles of Simon Sethos, in 1070–80. After the Ottomans had become masters of the country all the institutions which had contributed to preserve a better idiom perished at once. The people, left to themselves, oppressed by the most brutal despotism, would finally have abandoned their own dialect, which became constantly more corrupt, had not the Greeks possessed a sort of rallying-point in their Church. But even here, owing chiefly to the ignorance and corruption prevailing among the clergy, little could be found to prevent the further debasement of this fine dialect, which continued till the middle of the 18th century. About this time many of the Greeks began to resort for instruction to the universities of the West, whence they returned to their native country to animate their fellow-countrymen with the desire of making nearer approaches to the more civilized nations of Europe, so as not to remain behind in the general progress. One consequence of this was that the Greeks began to pay more attention to their mother tongue, and this tendency was increased by intercourse with the more refined West, by means of more frequent visits from intelligent men of that quarter to the ruins of Grecian greatness. The Patriarch (Samuel Eugene Bulgars Theotokos) of Corfu, and the unfortunate Rhigas, may be mentioned as eminent at this period.

At first a large part of the literature of

awakened Greece consisted of translations from the French, but the country now furnishes original writers in every department of literature. Among the theological works of modern Greece perhaps the most remarkable is that on 'Truth,' by Pharmakidis (1852), which is one of the most important works in the modern Greek language. The philosophical and mathematical sciences are all well represented. For these branches of knowledge much has been done by the University of Athens, many of the professors of which have published manuals (some of which have no inconsiderable scientific value) on the subjects on which they lecture. With the exception of poetry, history is perhaps the department which has attracted most writers in the modern Greek language. On this head the long and learned dissertations prefixed by Spiridion Zampelios to his 'Popular Songs of Greece' (Corfu 1852), and 'Studies on Constantinople' (1858), affording valuable and interesting materials for the history of Greece in the Middle Ages, deserve to be particularly mentioned. In the department of philology and scholarship Coray has performed important services by collecting a large mass of materials for acquiring a more thorough knowledge both of ancient and modern Greek; and after him Doukas, Darbaris, Asopios, and Rhangabe, ought to be noticed for their editions of the ancient classics with commentaries in modern Greek. At the head of the orators of the time of the struggle for independence stands Trikoupi, some of whose speeches were collected and published in 1829, and a second and enlarged edition of them in 1860. In the department of poetry a distinction must be made between that of the people and that of the cultivated classes. The former is represented chiefly in the songs of the Klephts and other songs dating from the war of independence, which are a faithful mirror of the public life at the time to which they belong. At this period the war-songs of Rhigas were caught up by the whole nation and sung with enthusiasm. At a later period the two Soutsos, Panagios and Alexander, Calvos, Solomos, and others, earned distinction in the same kind of poetry. The Soutsos were distinguished also as dramatists and novelists, and Alexander also as a satirist. Among the other leading dramatists are Rizos Neroulos and Zampelios. The most distinguished recent author, both a poet and a scholar, is A. R. Rangabé, while Demetrius Bikelas is the chief novelist.

Modern Greek, as spoken by the uneducated classes, is called Romaic, from the fact that it took on its special character at the time when the Greeks considered themselves as natives of the Roman empire, and hence called themselves *Romaioi*, or Romans. The Greek of the educated classes, that used in the newspapers and other literature of the present day, is distinguished from it by a greater resemblance to the Greek of antiquity, which renders it easy for any one who has a satisfactory acquaintance with ancient Greek to read the literary Greek of the present day. The domain of the Romaic comprises not only the whole of the present kingdom of Greece (including Thessaly), but also part of Roumelia, Albania, and Anatolia, the islands of Crete and Cyprus, as well as the islands of the archipelago not belonging to Greece. The purest Romaic is spoken in the

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1. Modern Athens.

2. The Piræus, Athens.

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less frequented isles of the archipelago, and in some of the mountainous districts of the interior. It is in these districts particularly that modes of expression are still found belonging to the most classical antiquity. At Megara the language is less corrupt than at Athens, where it is mixed with a considerable number of Italian words. In the northern provinces it is mixed chiefly with Albanian. Besides the foreign words which have been introduced into northern Greek, a pretty large number of words are found which have changed their original signification although they have retained their original form. Ancient words are most commonly found in significations the most remote from the original or derivative sense. The grammar has also undergone considerable modifications. For example, the numbers have been reduced to two by the suppression of the dual; and the cases to four, by the disappearance of the dative, the signification of which is now expressed by means of a preposition with the accusative. The first of the cardinal numerals is now used as an indefinite article. The degrees of comparison are sometimes expressed by the ancient inflexions, but at other times by the use of *pleon* (more). The past tenses of the verb are formed by the aid of the verb *echō* (I have), and the future tenses by the aid of *thelō* (I will). The infinitive mood, which has fallen out of use, has its place supplied by a periphrasis, in which the verb is put in the subjunctive. The middle voice has disappeared, and what remains of the old conjugation is of so little consequence that it may be regarded as an irregularity. The ancient orthography of the language is still preserved, but considerable changes appear to have taken place in the pronunciation. The vowels *α*, *ε*, and *υ*, and the diphthongs *αι*, *οι*, and *υι*, are all pronounced like *ea* in the English word *mean*. *B* is now pronounced as *v*, and the sound of *b* is expressed by *μπ*. *Δ* is pronounced like *th* in *thus*, and *θ* like *th* in *think*.

Consult: Néroulos, 'Cours de Littérature Grecque Moderne' (1828); Rangabé, 'Histoire Littéraire de la Grèce Moderne' (1877); Nicolai, 'Geschichte neugriechischer Litteratur' (1876).

Greek Architecture. *First*, that which has existed in Greece, that is the land of the Hellenes, which, for art purposes, includes everything south of Mount Olympus on the east coast and the Island of Corfu on the west. This architecture is of several very distinct epochs. *Second*, the architecture identified with the Greek spirit at the time of the highest intellectual development of the race—viz. from about 500 B.C. to the Roman Conquest; and which is in architecture represented by the famous styles called Doric and Ionic, with the Corinthian just appearing at the time when the freedom of Greece was at an end. Each of these definitions of the term requires separate treatment.

First.—The architecture of the land of Greece is known to us in its earliest form by certain tombal chambers, in which a circular or polygonal room is enclosed and roofed with stone by one operation, that is, by laying the stones in courses continually projecting inwards, and so decreasing the size of the chamber within, until at last a single cap-stone closes the aperture at the top. These stone structures had passages leading to them, enclosed and roofed with stone; and these passages allowed of the cover-

ing in of the whole stone edifice with earth, perhaps in huge, high mounds. In this way, as in northern Europe and also in the peninsula of India, a great funereal monument was erected which cost nothing but the labor of transporting many thousand tons of earth and rough stone in addition to the comparatively slight building of the stone chamber and passage. The largest of these is among the ruins of Mycenæ, and has been known for many years as the Treasury of Atreus. More elaborate buildings are of what is known as the Mycenæan epoch (see MYCENÆAN) which is not accurately fixed, but which it is customary now (1904) to place at about 1700 B.C., lasting perhaps for 500 years. The name Mycenæan comes from the city of Mycenæ, explored first by Dr. Schilemann in 1876. We know only its remains, painting upon walls, inlays of metal, pottery and the like, and something is known of the plan of the royal palace and its accessory buildings; but no part of this enables us to fix the date. If we assume that this artistic civilization lasted until about 1200 B.C. there is less a lapse of time before the Homeric conditions began; for the palaces and fortresses described in the Iliad are generally accepted as of about 1,000 B.C. Again a blank occurs, and the earliest buildings of the Proto-Doric may be thought to begin about 600 B.C.

For the classical art of Greece, that is the building of the celebrated and beautiful temples, see the second part of this paper. This classical epoch lasts until the Roman conquest, and even beyond it in a modified form. Thus the gateway of the Agora in Athens is Doric of a style not used until the Roman control had begun; and it is extremely curious to compare this with the Doric of 500 years earlier. The Roman governors and generals built memorial buildings, porticoes and temples in a curiously modified style, partly pure Greek, partly of that Romanized Greek which was beginning to be recognized as the Imperial art for the whole Mediterranean world. Under the reign of Hadrian an attempt was made to return to a purer taste, but this was of brief duration. Greece was not to have an art of her own again until the Byzantine style was well established (see ARCHITECTURE and BYZANTINE ARCHITECTURE). The Byzantine style in the land of Greece was singularly characterized by very small proportions; there has never been an interesting style of which the monuments are so diminutive; important churches exist in Athens and other cities which would not hold two hundred persons and which are delicately built in a refined shape, and prettily if not richly decorated. The architecture of modern times in Greece is not more intelligent than that of the rest of Europe, while it is very simple and inexpensive. The country is small and poor, and even a royal palace cannot have much costly treatment; moreover the buildings in Athens are mostly of German design, according to the taste of the first dynasty established there after the freeing of Greece in 1823.

Second.—Grecian architecture in the sense of the classical style begins with what we call the Proto-Doric style as exemplified by the temple at Corinth, a building with low, thick columns and a comparatively high entablature, as far as can be ascertained. It is thought by some that the Heraion (that is the temple of Hera) at Olympia, is a still older building, and in that

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case the earliest piece of classical Greek architecture. It is curious in form, as it has six columns at each end with sixteen on each side, the corner columns being counted twice, that is to say, there are forty columns in all. The peculiarity of this will be seen when we speak below of the perfected type of Doric temples. In the Olympia building the columns are of different sizes, varying even more than a foot in their thickness, and the capitals also differ. The common explanation, that the columns were originally of wood and were replaced by stone, one at a time, at all events points to the extreme irregularity of the structure. The Doric buildings of accepted and permanent type may thus be thought to appear first at the beginning of the 5th century B.C. The Greek colonies in southern Italy and Sicily were flourishing at this time and we find some of the earliest Doric temples of classical form in Pesto (the Roman Paestum, the Greek Poseidonia), in Campania and in Selinunte and Girgenti in Sicily. The style rapidly took definite form and was reduced at an early date to a very definite set of rules. Thus it became a recognized arrangement that the columns on the flank of the peristylar temple should be twice as many as those on the front and one more: the corner column being always counted twice. Thus the hexastyle temples at Athens, in Pesto and elsewhere, having 6 columns in front, have 13 on the side; and the only two octostyle Doric temples known—the Parthenon at Athens and the great temple at Selinunte—have 17 columns on the side. But all temples were not peristylar; on the contrary by far the greater number had porticoes only at the east front or at the east and west end. The essential parts of the temple are, of course, the closed naos or, as the Romans called it, the cella, in which the statue of the divinity was preserved, together with certain treasures, consecrated gifts and the like. There must have been thousands of these little shrines in Greece, the Greek islands and the colonies. A somewhat larger temple would have a second chamber, the treasury (opisthodomos) at the rear or west end of the cella, and this would have its own portico. The Temple of Theseus (so called) at Athens seems to have had a single chamber and two porticoes, one at either end, these being deep and sheltered and affording place for certain sacred statues and the like. Larger temples, like the Temple of Zeus at Olympia, the Parthenon at Athens, and the one at Pesto, called the Temple of Neptune, have the interior of the cella divided into a nave and aisles by two rows of columns; but just what the connection was between these columns and the carrying of the roof is not rightly understood. Some archaeologists associate them with the assumed arrangement for admitting daylight into the interior through the roof (see *HYPÆTHRAL THEORY*).

The style of design was this—the columns were thick in proportion to their height and tapered from bottom to top, but not as a cone tapers, for the diminution of thickness follows a decided and even visible curve which is called the entasis. These columns are channeled from top to bottom by grooves, usually twenty in number, each having an elliptical curve or nearly so and meeting one another at sharp arrises. These shafts carried capitals made of one or

two blocks of stone but always in two architectural parts. The lower part is what is called the echinus. It is a circular slab of stone projecting all round as much as half the diameter of the shaft in the earliest examples, perhaps a quarter of that diameter in the later ones; and this projection is rounded in a very subtle way, becoming flat below near the shaft and rounding more rapidly above. The curve of some of these echinus capitals is of extraordinary beauty. The uppermost member of the capital is a thick square block, or die, or plinth, sharp-cornered, without ornament of any sort except for the painting. These columns carry the epistyle or architrave, which, in the Doric style, is usually plain. Upon this rests what is known as the frieze, which consists of a series of upright blocks of stone perhaps half as high again as they are wide, and their height increased in appearance by grooves running vertically. These triglyphs carry, or seem to carry, the third or crowning member, the cornice, but between the triglyphs are the spaces called metopes, which are commonly filled by slabs or blocks of stone, the outer surface of which was always a favorite place for ornamentation. The cornice projected very much beyond the frieze, and its under side was cut with a drip moulding so that rain-water would not back up and run down the entablature, that being the name given to the three parts taken together, that is, to the whole horizontal superstructure laid upon the columns. There was nothing above this cornice except at the two ends the rising gable which marks the slope of the roof (see *PEDIMENT*), and on the side a gutter for rain-water with spouts or scuppers in its outer space.

The building of the temple was in this way as simple as possible—square cornered, oblong, roofed with a simple gable-roof, without arches or windows or chimneys. Its decoration was largely in the extreme refinement of the parts. The proportion of height to width, the spacing of columns and their shape and character were helped out by an extraordinary system of curves by which a grace was added to the building which the eye could hardly follow in its cause or character, but which changed the whole aspect very greatly. Thus the entablature was cut with an upward curve toward the middle and in this way the whole building had a lighter aspect than if it had been strictly horizontal. The same upward curve was repeated in the stylobate or stone floor on which the columns stood. The columns themselves were curved in outline as above stated, and they were set so as to slope inward, the outer ones the most, this for the obvious purpose of making the building seem more solidly set upon its base. To the building so carefully designed there was often added a great deal of elaborate sculpture (see below) and, apparently in all cases, rich chromatic decoration. For this subject see *POLYCHROMY*; but it may be mentioned here that the modern world has no very clear notion of what was the effect of brilliant painting in red and blue, with gilded metal, applied to a marble building standing high upon a prominent rock in the heart of a town, the recognized centre of interest and the chief religious shrine. No living man has ever seen anything at all like that; and it is probable that no imagination can reproduce it in thought.

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To the modern student, the Doric style as described above, is much the most important part of Grecian architecture; but to a Greek of the time of Alexander the Great the Ionic temples along the shore of Asia Minor would have seemed the more grand and costly, the more recent, and therefore the more identified with advanced civilization. Those great temples have disappeared with a strange completeness. While there are Doric temples nearly complete except for the roof—which has, of course, disappeared,—while there are many others of which large and most interesting remains exist, many columns standing erect and some parts of the superstructure,—there is almost nothing remaining in complete condition of all the great Ionic temples. It is on this account that the exquisite building on the Acropolis at Athens, the Erechtheum, contains in itself almost all our modern notions of the style. Very near it on the Acropolis is the little square amphiprostyle temple, known as the Temple of Athenæ Nike, or as the Temple of the Wingless Victory, and this shrine may also be considered an unchanged Greek building, because, though it was entirely destroyed, the stones of it were found built into a Turkish fortification and the whole structure was piled up again by the engineers of the first European king of Greece, Otho of Bavaria, who reigned from 1832 to 1862.

We learn from these buildings what the style really was. The shafts of the columns are much more slender than those of the Doric style and are fluted with circular grooves which are separated from one another by narrow fillets instead of meeting at a sharp edge. There is a base composed of mouldings running around the column. The capital is very peculiar, having volutes or scrolls at either side so that each capital has a front and a back precisely alike, and two ends alike, differing from all other capitals in not being alike on at least four sides. The members of the entablature are the same as those of the Doric style, but there are important differences in them. Thus the epistyle, instead of being a plain smooth block, is divided into three parallel surfaces, each one slightly overhanging the one below; the frieze is continuous and not broken by triglyphs; the cornice is more richly sculptured. Figure sculpture is applied in a somewhat different way. Thus as the frieze has no triglyphs it may be carved continuously; and in the Erechtheum the sculpture is in the form of statuettes in white marble secured to a gray marble ground. It is not quite decided whether this color effect was helped out by painting or gilding, and how far the other parts of the temple were painted in bright colors. Again in the famous temple of Artemis (Diana) at Ephesus, the lower part of the shafts of the columns was in some cases very richly sculptured. The term *columna calata* is applied to one of these columns and in any one of them is found this unique device:—the base is rather unusually high and is divided up by many mouldings; beginning about four feet from the pavement is a circle of figures larger than life surrounding the lowermost of those blocks of marble which make up the shaft proper; the flutings then begin above the band of sculptured figures and stop beneath the capital in the usual way. Not all the columns were arranged in this way, apparently only about one fourth of the

whole number. The ancient Temple of Artemis which existed before the later magnificent structure was built had the same singular arrangement of sculptured shafts. Near Ephesus there have been found some capitals in which the head and shoulders of a bull project on either side beyond the volutes of the capital; and on the Island of Delos there are capitals made up entirely, so far as their decorations are concerned, of the heads of bulls. In the Erechtheum of Athens there is that wonderful Portico of the Maidens in which an entablature made up of peristyle and cornice alone, without frieze, is supported on the heads of six caryatides, that is, draped female statues. In the National Museum at Athens are some caryatides of another portico. In the Incantada, a ruined Greek building in Salonica, there is a row of caryatides high up in the wall. The pilasters are treated with capitals of a curious style of Asiatic sculpture in the temple of Miletus. If to this we add the extraordinary capitals which some few monuments possess, monuments which must be called Grecian, but which are quaint and barbaric in appearance and almost grotesque, it appears that the Ionic was not as disciplined a style as the Doric but was influenced by the highly decorative sense of the Asiatic peoples and allowed of great variety of decorative design.

The Corinthian style is so little known to us as of Greek invention and use that it is almost always considered as a Roman or at most a Greco-Roman style; but the unquestionably Greek building, the little choragic monument of Lysicrates in Athens is Corinthian and the equally unquestioned and much more splendid round building at Epidaurus, was absolutely Greek, of pure type, and possessed a Corinthian order; the capitals completely developed. The dates are approximately, of the Athens building, 335 B.C.; of the Tholos, about the middle of 4th century B.C. The Athenian monument stands tolerably complete. The round building at Epidaurus is ruined and the capitals much scattered, but a single capital was found in a cellar or a chamber built for that purpose, and evidently intended to preserve it as a pattern, and this is intact. It is also one of the most beautiful Corinthian capitals known to us. The style, however, is almost identified with Roman work and will be treated in connection with ROMAN IMPERIAL ARCHITECTURE.

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Greek Art. Modern students of Grecian archæology do not doubt that the Greeks of different epochs were as successful in painting of stately and religious subjects and of painting and drawing in a slighter and more popular way as they were in sculpture; but this is merely an inference. Absolutely nothing remains to us of Greek painting of high class. We can study the figures on Greek painted vases and notice their admirable disposition and the beautiful designs made of their combinations, and we can note the technical system followed, sometimes by drawing on the clay with a hard point, sometimes without that help and drawn evidently with the brush alone. The use of pigment, too, generally black but sometimes of other colors, can be perfectly understood; but this is all of the simplest character, nor can we draw any conclusions at all about the wall-paintings or panel-paintings

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of the Greeks. In the houses of Pompeii there are many wall-paintings which seem to have had a non-Italian and probably Greek origin, and furthermore it is known that Pompeii was a town of Greek settlement and retained much Grecian influence even under the Roman Empire. Some portrait heads have been found in Egypt painted on panel (that is, thin boards) and these are certainly non-Egyptian; they may be assumed to be Greek, of the Alexandrian epoch. In these, however, there is no background, no added incident, which might guide us to a knowledge of Greek design in Graphic art. Finally, some paintings discovered in Rome, though belonging to houses of late date, are altogether Greek in design; and these may well be reduced copies, or imitations, of famous originals three hundred years earlier. None of these paintings are of great importance. None of them give us an exalted idea of the painting which stood for their original impulse. The statements made by ancient writers with regard to the paintings of their own time and those who were then famous as having belonged to earlier times, are of very little use, because we have no standard with which to compare their critical remarks, and furthermore because no one of the books remaining to us from antiquity seems to be the work of a man greatly interested in fine art. For this reason the paintings on the vases are worthy of the most minute examination. The earliest style in which the subjects represented are at all elaborate are of the undetermined epoch which we call the Mycenaean. Those vases are rich in patterns of scrolls, bands, zig-zags and spots with, somewhat rarely, animal forms introduced in bands and (as in Crete and Cyprus) as a principal subject and covering a large part of the body of the vase. The painting is generally in brownish red on a dull yellow ground, which is the natural color of the clay. The famous Warrior Vase found at Mycenae and now in the Central Museum at Athens and which we must suppose to date from 1000 B.C., has much of that grotesque indifference to form and perfect satisfaction with an indication of meaning which we associate with barbaric art in all ages: the human form is drawn without any comeliness or grace and without any success in getting control of gesture; but the purpose is clear, viz., the displaying of a procession of warriors wearing large helmets, carrying great shields of the curious kidney shape long afterward associated with certain Asiatic influences, and carrying spears in the right hand, which spears have sometimes two heads or what seem to be heads.

The paintings on pottery which are of the most interest are those of the period beginning about 600 B.C. and ending about 150 B.C. The earlier pieces are, of course, difficult to date even approximately. They represent warriors engaged in battle, the scene forming a broad band running around the vase; lions, bulls and stags arranged again in horizontal bands; figures draped in long garments, men as well as women carrying stringed instruments, weapons, baskets and the like; occasionally a scene which can be identified, as where Hercules brings the Erymanthian boar to show to his brother, king Eurystheus, or where Peleus is about to carry off Thetis from among her attendant nymphs; or

they represent a feast, with men reclining on couches and others acting as attendants bringing pitchers and vases to fill the cup held by the reclining guest. The beautiful black glaze of the vases is used sometimes as the pigment for the figures and sometimes to work the background around the figures. These two styles are known as the black-on-red or black-figure style, the other as the red-on-black or red-figure style, and this latter style is known as the later of the two. There is still another form which is generally the latest of all. In this the black glaze is worked over the whole vase except for a panel or medallion or even a band around the vase, which is left in the red color of the pottery, and upon this the figures are painted in black. From the 5th century on the drawing is extremely vigorous and significant. It is grotesque sometimes, as where the muscles are given excessive prominence or where the attitude is exaggerated in the attempt to make it tell the story; but everywhere the drawing of the outline and the filling in with color shows singular mastery.

In a few cases the drawing itself is faultless; but in by far the greater number of cases, even of a good time, it is rather the evidently slight and swift work of a man familiar with nature and with the best traditions of art but not using his whole strength in the slight painting of the earthenware. The use of pigments other than the black glaze is not very frequent; but a red somewhat brighter than the color of the clay is used, also a kind of violet, more rarely a green, and in some cases gilding is applied — especially in late and very elaborate work. A small class of vases, identified with the city of Athens, has the body covered with a solid coat of white, upon which figures are painted in various bright colors; but this work is perishable.

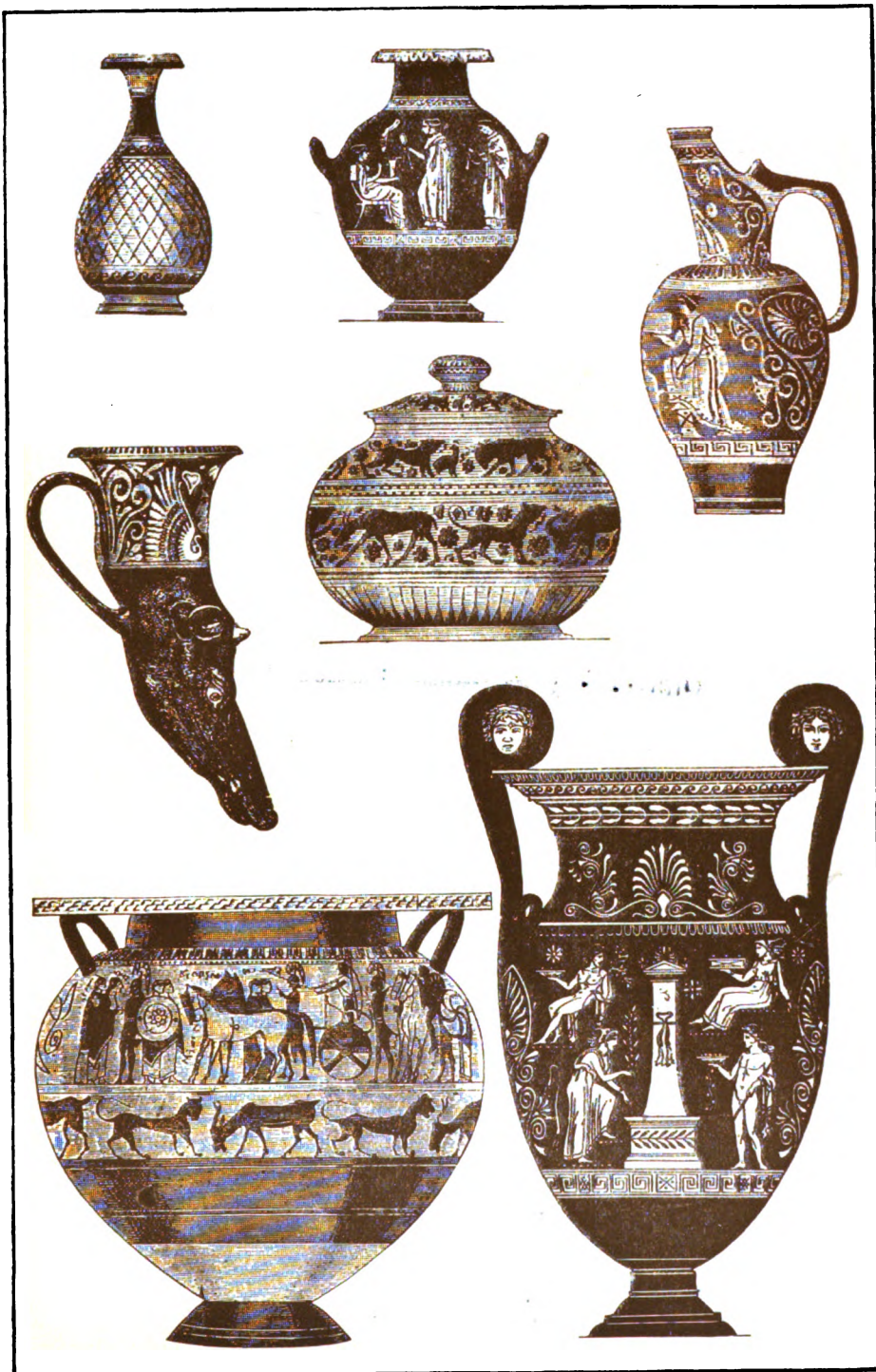
In close connection with the drawing and painting applied to pottery is the engraved work on the backs of bronze mirrors, on pieces of armor, and on cists (*cistae*). Even as in modern times some of the most elaborate and precious drawing is that of the engraver working on copper-plate (though he proposes to take prints on paper from his engraving), so the Grecian draughtsman put some of his finest work on those engravings meant for pure decoration. As we have no free drawing on paper or plaster or wood — nothing that shows how the Greek drew with a free hand — we can only reason backward from the firm and resolute setting down of lines drawn on the resistant material with the sharp point, and infer the vigor and daring of the more unfettered design.

Sculpture in its different forms is, after all, that which Greece has left us which is most important. We have the marble reliefs carved upon temples, tombs, and the walls of sacred enclosures, and also a great number of slabs which, when more than two or three feet in either dimension are generally tombstones, but which, when small, are frequently mere records carved upon a boundary stone or a memorial, or else a votive slab dedicated at the shrine of some divinity. In all of these the propriety and the freedom of design are wonderful and, in relief sculpture at least, the Greeks have set an example which has never been equalled since, neither in the actual beauty of the form nor in the intelligence shown in the composition. The



GRECIAN ART

Univ. Library, UC Santa Cruz 2001



GREEK VASES

Univ. Library, UC Santa Cruz 2001



GREEK VASES

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GREEK CHURCH

most wonderful of the low reliefs are those of the famous frieze which forms the crowning member of the wall of the Parthenon within the screen of columns, the wall of the naos or cella. The well-known fact that this whole composition was painted in bright colors changes at once our ideas as to its decorative effect as a part of the building, but modern students can form no correct idea of the appearance of elaborate sculptures painted in an artistic fashion because they have never seen anything of the kind. One special reason why the reliefs are peculiarly important to modern students is their undoubted originality. The sculptures found at Phigalia, at Halicarnassus, at Xanthos, and at Gjolbaschi in Asia Minor are the undoubted work of the 4th and 5th centuries, and moreover they were designed for the places in which we now find them. This is not so with statues and busts, for of all the great world of Grecian statuary only three or four undoubted originals of the first rank remain. The Hermes of Praxiteles was found as Pausanias saw it in the 2d century A.D.; the Winged Victory of Paionios also; and these two were found in the excavations at Olympia in Greece. Statues of somewhat less importance have been found in the islands of the Greek archipelago and in specially protected underground chambers in the mainland of Europe, and a number of splendid bronzes, were found in a single great country house at Herculaneum near Naples; but as a general thing it has to be settled by internal evidence whether the piece discovered is of unmingled Greek character or of a less simple and perfect later style. The statues of the pediments, however, those which once stood at either end of the Parthenon, the Temple of Zeus at Olympia, the great temple of Ægina, and those which seem to have been placed between the columns of the Nereid Monument at Xanthos, are almost as certainly of their apparent epoch as are the bas-reliefs of the same buildings. In this way we have a score of fairly complete marble statues, two or three bronze statues of the highest rank, and a dozen less important ones, a score of life-size busts, and many smaller bronzes, all of which are assuredly of the best time of Greek art. Our knowledge of this subject is greatly helped by the study of engraved gems and coins. The gems were used for seals, or set in finger rings worn hung by a string, and the materials used were, of course, very hard stones, such as chalcedony and sardonyx; though glass was used also, and some seals are engraved in gold. The figure engraved in intaglio can be seen as if in relief when the stone is transparent and is looked at from the back. But commonly the student takes a cast in plaster or wax and studies that relief together with the original hollow sculpture of the gem. The number of these gems in our public and private collections is very great, even if we consider only those of undoubted Grecian origin. The coins are, in art, of the same character as the gems, because they are struck from a die, which die has been engraved in the same way in which the intaglio in hard stone is engraved; that is, the artist in either case keeps in mind the future relief and carves his hollow or sunken design rather with a view to its utility as a die than as to its own appearance. Greek coins are the subject of much and careful study among modern

students. Greek sculpture includes also the earthenware figurines which have been found in great number in the neighborhood of Smyrna, in Sicily and the other islands of the Mediterranean, and especially in the neighborhood of Tanagra in Greece.

The years since 1850 have been rich in books on the subject of Grecian archæology, which archæology is, in great measure, the study of the existing works of art; books on Grecian vase-painting, gems and coins are to be counted by scores and hundreds. The latest are generally the best to begin with. The student will find in them the best means of judging what earlier books he may need; and at the same time he will find the latest discoveries and the most mature opinions of archæologists. The same remark applies to the periodicals, of which there are many and very valuable, for indeed much of the comparative study of this subject has been carried on in the columns of German, French and English periodicals, often issued by learned societies.

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Greek Church, or Holy Oriental Orthodox Apostolic Church, that section of the Christian church dominant in Eastern Europe and Western Asia, especially in Turkey, Greece, Russia, and some parts of Austria. In the first ages of Christianity numerous churches were founded by the apostles and their successors in Greek-speaking countries; in Greece itself, in Syria, Egypt, Mesopotamia, Asia Minor, Thrace, and Macedonia. These were subsequently called Greek, in contradistinction to the churches in which the Latin tongue prevailed. The removal of the seat of empire by Constantine to Constantinople, and the subsequent separation of the eastern and western empires, afforded the opportunity for diversities of language, modes of thinking, and customs to manifest themselves, and added political causes to the grounds of separation. During the earliest period the chief seats of influence in the Eastern Church were Jerusalem, Antioch, and Alexandria, the seat of that mystical philosophy, by which the oriental church was distinguished. In 341, soon after the synod of Antioch, the rivalry between the Bishop of Rome and the Bishop of Constantinople began to assume importance, and before the year 400 differences of doctrine with respect to the procession of the Holy Spirit appeared. The Council of Chalcedon in 451 reaffirmed the "pre-eminence of honor" after Rome, which had been granted Constantinople by the Second General Council in 381, but also accorded to its bishop supremacy, not only over Thrace, but over Pontus and Asia. This canon, the famous 28th, Rome refused to confirm. The title of *Œcumenical Patriarch* was assumed by John, bishop of Constantinople, in 588, and in the following year the phrase 'Filioque' ('and the Son') was added by the Latins to the Nicene Creed (which now read 'proceeding from the father and the son'), an addition to which the Greek Church was opposed. In 648 Pope Theodore deposed Patriarch Paul II.; but a reconciliation of the churches was effected at the Council of Rome (680). The doctrines of the Greek Church were defined by John Damascenus in 730. The disruption was hastened by the banishment of Ignatius by Michael the Drunken, and the consecration of Photius (858). Pope Nicholas I. refused to sanction

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the usurpation of Photius and excommunicated him. The schism was temporarily healed after the death of Photius, but Michael Cerularius reopened it by charging the Latins with heterodoxy. He was excommunicated by Leo IX. in 1054, since which the Greeks have been severed from the Roman communion, though the Russo-Greek Church was not separated until the 12th century. The presence of the Crusaders in the East aggravated the quarrel; Latin patriarchates were established in Antioch and Jerusalem, and, though on the capture of Constantinople by the Crusaders a Latin patriarchate was set up there (1204), the schism was revived there as soon as the Latin empire fell (1262). Reunion was proposed in 1273 by Patriarch Joseph, and effected, with the acknowledgment of the pope as primate, at the Council of Lyons (1274). The union, however, was annulled in 1282 by Emperor Andronicus II., and in 1283 and 1285 by synods of Constantinople. It was again effected under John Palæologus at Florence in 1439, but was repudiated in 1443 by the Patriarchs of Alexandria, Antioch, and Jerusalem. In 1453, when the patriarch fled from the Turks, a schismatic, Gregory Scholarius, was chosen in his place. In 1575 unsuccessful negotiations were commenced with a view to union with the Lutherans, and in 1723 the English bishops even proposed that the Greek and Anglican churches should unite, a proposal revived by the archbishop of Moscow in 1866. The claims of the czar in 1853 to the protectorate of the Greek churches in Turkey was one of the causes of the Crimean War.

The Greek Church is the only church which holds that the Holy Ghost proceeds from the Father only; the Roman Catholic and Protestant Churches deriving the Holy Ghost from the Father and the Son. Like the Roman Catholic Church it has seven sacraments—baptism; chrism; penance, preceded with confession; the eucharist; ordination; marriage; and unction. But it is peculiar (1), administering baptism by threefold immersion, the chrism (confirmation) following immediately after it; (2), in adopting, as to the eucharist, the doctrine of the real presence and transubstantiation; but in ordering the bread to be leavened, the wine to be mixed with water, and both elements to be distributed to every one, even to children; (3), the parochial clergy are required to be married, but only once and to a virgin, and marriage must take place before ordination; widowed clergy are not permitted to retain their livings, but go into a cloister, where they are called *hieromonachi*. Rarely is a widowed bishop allowed to preserve his diocese. The Greek Church grants divorce in case of proved adultery, but it does not allow even the laity a fourth marriage. It differs also from the Roman Catholic Church in anointing with the holy oil, not the dying but the sick, for the restoration of health, forgiveness, and sanctification. It rejects the doctrine of purgatory, works of supererogation, indulgences, and dispensations, but admits prayers for the dead, whose condition appears to be considered undetermined until the final judgment. It recognizes no visible vicar of Christ on earth, but the spiritual authority of patriarch is little inferior to that of the pope. It allows no carved, sculptured, or molten image of holy persons or subjects; but the representations of Christ (except in the crucifix), of Mary, and

the saints, must be merely painted, and at most inlaid with precious stones. In the Russian churches, however, works of sculpture are found. In the invocation of the saints, and especially of the Virgin, the Greeks resemble the Latins. They also hold relics, graves, and crosses sacred; and crossing in the name of Jesus they consider as having a wonderful and blessed influence. Among the means of penance, fasts are particularly numerous with them. They fast Wednesday and Friday of every week, and besides observe four great annual fasts, namely forty days before Easter; from Whitsuntide to the days of Sts. Peter and Paul; the fast of the Virgin Mary, from the 1st to the 15th of August; and the apostle Philip's fast, from the 15th to the 26th of November; besides the day of the beheading of John the Baptist, and of the elevation of the cross. The calendar of the Greek Church is in the old style, their New Year's Day falling on 13 January.

The services of the Greek Church consist almost entirely in outward forms. Preaching and catechizing constitute the least part of it. Instrumental music is excluded altogether. The Mass is considered of the first importance. The convents conform, for the most part, to the strict rule of St. Basil. The Greek abbot is termed *hegumenos*, the abbess *hegumenā*. The abbot of a Greek convent which has several others under its inspection is termed *archimandrite*, and ranks next a bishop. The lower clergy in the Greek Church consist of readers, singers, deacons, etc., and of priests or popes and protopopes or archpriests, who are the first clergy in the cathedrals and metropolitan churches. The members of the lower clergy can rise no higher than protopopes, for the bishops are chosen from among the monks, and from the bishops are selected the archbishops, metropolitans, and patriarchs. In Russia there are twenty-four dioceses. With which of them the archiepiscopal dignity shall be united depends on the will of the emperor. The seats of the four metropolitans of the Russian Empire are St. Petersburg, Kiev, Kasan, and Tobolsk. In the Turkish dominions the dignities of Patriarch of Constantinople, Alexandria, Antioch, and Jerusalem still subsist. The Patriarch of Constantinople still possesses the ancient authority of his see; the other three patriarchs exercise a very limited jurisdiction, and live for the most part on the aid afforded them by the Patriarch of Constantinople.

The United Greek Churches comprise those Churches of Greek rite which are in communion with the See of Rome: the adherents of these Churches are commonly styled Uniates, and the Churches Uniate Churches. There are five such Uniate Greek Churches, namely, those of the Melchites, of the Ruthenians, of the Greek Catholics of Italy, of the Græco-Romaic rite, and of the Bulgarians. These several Churches retain their several Greek or Oriental liturgies and sacramental rites and most of the usages and ceremonies of the Eastern schismatical Churches from which they are sprung.

The Melchites represent those Churches of Syria and Egypt which, in 1686 and later, seceded from jurisdictions of the Monophysite patriarchs of Antioch, Jerusalem, and Alexandria. Their number is small, perhaps not exceeding 50,000 souls, but they have three patriarchs, with bishops subordinate to them.

GREEK FIRE—GREEK-LETTER SOCIETIES

The Ruthenian United Church is an offshoot of the Russian Greek Church by secession; the membership of this Church in Russian Poland and in the Austro-Hungary monarchy comprises probably 1,000,000 souls.

The United Greeks of Italy, mostly in Calabria, are estimated at 30,000.

The Græco-Romaic Church of Hungary and Transylvania has about 1,000,000 adherents.

The United Bulgarian Church dates from 1860, when several bishops with a considerable following of their people were received into the communion of the Church of Rome.

All these Churches retain the ancient Greek liturgies of the Eastern Churches from which they seceded, and to a great extent their ancient systems of discipline. The priest, as in the Greek orthodox and in the Russian orthodox Church, must be married, and the bishops must be celibates; hence the bishops are usually chosen from the monastic order. The widowed priest is not permitted to contract a second marriage. In short, these Churches retain, of the religious practices and of the discipline of the several Eastern Churches from which they seceded, whatever is not inconsistent with allegiance to the supreme pontiff in matters of doctrine.

The language of the Ruthenian United Church's liturgy is Old Slavonic, and translated from one of the ancient Greek liturgies. The liturgy of the Melchites is that of St. John Chrysostom, and on certain occasions that of St. Basil, both in the original Greek. The liturgy of the Bulgarian Church is also of Greek origin, but translated into an ancient Slavonic idiom.

Greek Fire, a combustible composition made probably of naphtha, sulphur and nitre, which was first used in 673 A.D. by the Greeks of the Byzantine Empire against the Saracens. Its invention has usually been ascribed to Callinicus of Heliopolis, and to the year 668 A.D. The mixture appears to have been highly inflammable, and to have been difficult to extinguish; was poured out, burning, from ladles on besiegers, projected out of tubes to a distance, or shot from balistæ, burning on tow tied to arrows. At Constantinople the process of making Greek fire was kept a secret for several centuries; but the knowledge of its composition and the use of it, gradually spread to the West. It was in use for a short time after the invention of gunpowder. Combustibles of a similar kind were used at the siege of Charleston in 1863, composed of sulphur, nitre, and lamp-black; and naphtha in shells was also tried.

Greek-letter Societies, or **College Fraternities**, are found in nearly all leading educational institutions, particularly the great universities, in the United States. Branches of the various societies are known as "chapters," and are found in nearly every college as well as in every large city in the country. No society has more than one chapter in any one college. While these societies are secret in character there is neither ritual nor mystery in their conduct, the protection of meetings, constitution and mottoes being all the secrecy involved. The Greek alphabet is generally used in naming a fraternity, or a chapter. There are three types of badges worn by members, the name badge, monogram badge, and symbol badge. In the latter a key, skull, or scroll is usually employed.

The oldest of these literary and social brotherhoods was established as early as 1776, and continued the sole society of its kind for 50 years. There were in 1902 more than 800 chapters of these societies in American colleges, with a membership including the alumni, of more than 100,000. It has become quite the practice for students of a particular fraternity to reside together during their college course in their "chapter" house. In 1901 there were 70 such houses in the United States owned by the "chapters," and 200 other houses rented by them. Princeton is the only prominent college in the country where the fraternal society is prohibited, and the fact that all the other leading institutions permit these organizations to exist affords strong presumption that they are regarded with favor, and that their influence is for good rather than for evil. In 1910 there were 33 of these societies for men and 17 for women, in the universities and colleges of the United States.

Phi Beta Kappa.—This, the oldest organization, is composed of 71 college chapters, and was founded 5 Dec. 1776, at William and Mary College, Williamsburg, Va. A chapter was formed at Yale, in New Haven, in Dec. 1779, and soon after at Harvard, Dartmouth, Bowdoin and Amherst. The society in 1910 had a membership of 15,500. The national council meets triennially. The badge of the society is a golden key. Among prominent members are T. W. Higginson, Seth Low, Joseph H. Choate, and H. W. Mabie.

Kappa Alpha.—Founded in 1825 at Old Union College by four members of the Phi Delta Kappa. It likewise had a golden key as a badge design. The first branch of this society was established at Williams College. The society had 1,200 members in 1910, prominent among them being Wheeler H. Peckham, John Boyd Thatcher, L. Clark Seelye, and Edward S. Bragg.

Sigma Phi.—Founded at Union College, Schenectady, N. Y., 4 March 1827, the society established branches at Hamilton, Williams, Hobart, Lehigh, Cornell and the Universities of Michigan and Vermont. It had a membership of 1,475 in 1910. The badge of the society is of the monogram type; the colors are light blue and white. Among its members are Elihu Root, Andrew D. White, and John H. Post.

Delta Phi.—Founded at Union College, 17 Nov. 1827, this society established branches at Columbia, Rutgers, Harvard, Johns Hopkins, Cornell, and other colleges. The badge is in the form of a Maltese cross; colors blue and white. The fraternity had, 1910, 3,750 members, among them John Jacob Astor, Ernest Howard Crosby, and R. O. Doremus.

Alpha Delta Phi.—Founded at Hamilton College, Clinton, N. Y., in 1832, the society established chapters in 29 other colleges and had a membership of 7,372 in 1910. There were 24 houses owned by the society and 24 active chapters. The badge is of green and white, with the star and crescent as symbols. Among prominent members are W. R. Day, Bartow S. Weeks, Henry Clews, Jr., Jas. K. Hackett, and H. E. Lippincott.

Psi Upsilon.—Founded at Union College, 24 Nov. 1833, this society had 4 of its original founders still living in 1902. The membership of the organization was (1910) 11,661, with 23 chapters in various colleges. The badge is of gold, dia-

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mond-shaped; colors garnet and gold. Among its members are Chauncey M. Depew, Wm. C. Whitney, G. R. Schieffelin, and Herbert L. Bridgeman.

Delta Upsilon.—Founded at Williams College in 1834, and had in 1910 chapters in 39 colleges and universities, with a membership of 10,000. It is an open, non-secret organization and owns 24 chapter houses. Among its prominent members are David Starr Jordan, Rossiter Johnson, W. H. P. Faunce, and Rev. Charles M. Sheldon.

Beta Theta Pi.—Founded at Miami University, Oxford, Ohio, in 1839, this was the pioneer society of the Middle West. It had a membership of 17,028, with 73 active chapters. The badge is a shield with 8 sides curved inward; the colors are light pink and blue. Among its prominent members are Foster L. Backus, Paul Wilcox, and W. R. Baird.

Chi Psi.—Founded at Union College, in 1841, this was the first Eastern society to establish chapters in the West, extending its organization to the Universities of Michigan and Minnesota. It had a membership in 1910 of 5,260 with 17 active chapters. The chapter house at Cornell was the finest fraternity house in this country. The society is more secret than most of its fellows: The badge is a jeweled monogram. Among its members are Willis J. Abbot, Francis M. Scott, and Allan Lee Smidt.

Delta Kappa Epsilon.—Founded at Yale College, New Haven, Conn., 22 June 1844, by 15 members of the junior class. The society established 53 chapters and had a membership in 1910 of 17,475—the second strongest numerically of college fraternities. Among prominent members of the society are President Roosevelt, John D. Long, Whitelaw Reid, Howard Gould, Julian Hawthorne, Cyrus C. Adams, John DeWitt Warner, M. G. Hyde, Julius Chambers, and G. R. Hawes.

Zeta Psi.—Founded at the New York University, 1 June 1847, this society established 34 chapters, and had a membership in 1910 of 5,500. The badge is a monogram; the color white, with which each chapter blends its college colors. Among prominent members are Augustus Van Wyck, Wm. Shrady, Harrison Grey Fiske, and H. W. Bookstaver.

Delta Psi.—Founded at Columbia College, New York, in Jan. 1847; had 8 chapters and a membership of 2,600. The badge of the society is a St. Anthony cross, bearing a shield of blue enamel. Among its prominent members are Thomas Nelson Page, W. Seward Webb, F. W. Vanderbilt, Brander Matthews, Wm. E. Curtis, and D. S. Appleton.

Theta Delta Chi.—Founded like several of its predecessors at Union College, this society was organized in 1848; had, 1910, 27 chapters and 6,000 members. The badge is a monogram; the colors black, white and blue. Among its members are John Hay, J. W. Griggs, H. H. Hanna, S. Fred Nixon, and Rev. David Gregg.

Phi Gamma Delta.—Founded at Jefferson College, Canonsburg, Pa., in May 1848, this society established 57 chapters and had, 1910, a membership of 12,469. The badge is a diamond-shaped shield on a field of black, bound by a golden cord; the color royal purple. Among its members are Gen. Lew Wallace, Edward Eggleston, S. S. McClure, Leigh H. Hunt, and R. Lloyd Jones.

Phi Delta Theta.—Founded at Miami University, Oxford, Ohio, 26 Dec. 1848, this society established 92 chapters; had, 1910, a membership of 17,860. The badge is a shield, bearing a scroll; the fraternity colors are argent and azure. Among its members are C. P. Bassett, Irving R. Bacon, C. P. Van Alen, and Rev. E. A. Dent.

Phi Kappa Sigma.—Founded at the University of Pennsylvania, 16 Aug. 1850; established 43 chapters; had a membership, 1910, of 4,000. The badge is a gold Maltese cross, with a skull and crossbone centre; the colors are old gold and black. Its membership includes H. C. King, J. R. Paxton, M. J. Asch, Geo. G. Battle, and Wm. McClure.

Phi Kappa Psi.—Founded at Jefferson College, Canonsburg, Pa., 19 Feb. 1852; established 44 chapters which had, in 1910, 11,000 members. The badge is a shield of gold; the colors pink and lavender. Prominent among its members are Henry T. Scudder, F. E. Hamlin, W. L. Stoddard and Thos. A. Nelson.

Chi Pi.—Founded at Hobart College, in Dec. 1854, has organized 19 chapters with a membership of 4,700. The fraternity was reorganized in 1896. The badge is a monogram. Geo. S. Hobart, H. C. Platt, F. A. Mandeville, and F. C. Weber are among its prominent members.

Sigma Chi.—Founded at Miami University, Oxford, Ohio, 20 June 1855; organized 62 chapters with, 1910, 11,200 members. The badge is a cross of gold and white enamel; the colors are blue and gold. Among its members are Thos. Ewing, Jr., Wm. E. Quimby, H. W. Chatfield, and Henry A. Potter.

Sigma Alpha Epsilon.—Founded at the University of Alabama in 1856; organized 72 chapters; had, 1910, 13,362 members. Among its prominent members are Charles B. Harvey, F. K. Knowlton, T. W. Beach, and H. P. Nash.

Delta Tau Delta.—Founded at Bethany College in 1860; organized 52 chapters and has, 1910, a membership of 10,100. The colors are purple, gold and white.

Alpha Tau Omega.—Founded at the Virginia Military Institute, 11 Sept. 1865; organized 60 chapters; had, 1910, a membership of 8,500. Among its prominent members are Irving Bacheller, Hugh S. Thompson, E. B. Southworth and Walter H. Page.

Kappa Sigma.—Founded at the University of Virginia in 1867; established 77 chapters; had, 1910, a membership of 9,500. The badge is a crescent and star; the colors old gold, maroon and blue.

Sigma Nu.—Founded at the Virginia Military Institute, 1 Jan. 1869; organized 65 chapters; a membership of 8,000. The badge is designed after that of the Legion of Honor of France; the colors are black, white and gold.

Phi Sigma Kappa.—Founded at the Massachusetts Agricultural College, 15 March 1873; organized 23 chapters; a membership of 4,025. The colors of the society are silver and magenta. Among its members are Wm. H. Bishop, S. C. Thompson, J. W. Goff, Jr., and M. C. Valentine.

Among the Greek-letter Societies of women are the Alpha Chi Omega, Alpha Phi, Chi Omega, Delta Delta Delta, Delta Gamma, Kappa Alpha Theta, Kappa Kappa Gamma, and Pi Beta Phi. The Alpha Phi was founded in 1872; had, 1910, 15 chapters and 2,080 members. The Delta Delta

GREEK MUSIC — GREEK PHILOSOPHY

Delta was founded in 1888; had 33 chapters in 1910 with a membership of 4,000.

In October 1903 there was organized at the Indiana University the first negro Greek-letter society in the United States. It is known as the Alpha Kappa, with a charter membership of 10.

Greek Music, the theory and practice of melody and harmonics among the ancient inhabitants of Hellas. The subject of Greek music is an obscure and difficult one, but there are enough data extant to afford us a general idea of the Greek musical scale, of the use of instruments, and employment of the voice in solo and chorus among the Greeks. The earliest notion of music was derived from the necessity of keeping time in the dance. This at first would be effected by merely clapping the hands. The use of instruments of percussion would follow, and the drum and cymbal came into use. The cymbal originated in Egypt, and reached Greece as a permanent element in the practice of music. The rustle of the wind through the reeds, sometimes with a shrill whistling vibration, suggested the application of the human breath to hollow pipes, and what is still called the Pan's pipes was invented. Wind instruments of various kinds came afterwards into vogue, the flute, and the double flute were employed, and seem generally to have been blown as accompaniments to the elegy and the love song. These pipes were of various kinds and were considered as good accompaniments to the recitations of the poet, as well as for regulation of movement in a dance. They were employed in the ceremonies of the mysteries, and Plato speaks of an often recurring thought as resembling "the sound of the flute in the ear of the mystic."

Instrumental music attained its highest development in the invention of the lyre. The Egyptians attributed this invention to their god Thoth. In Greece Hermes is celebrated as the inventor of the lyre, which became henceforth the instrument of the epic poet and the rhapsode or reciter. It had originally four strings, which it is said were suggested by the tendons stretched over the shell of a tortoise. The first Greek philosopher to attempt a scientific theory of musical scales and intervals appears to have been that profound and versatile man Pythagoras (585 B.C.). The Greeks did not use the word music in application to the art which we so name. Music to them comprised everything which the Muses inspired, and even history and astronomy as well as poetry were music. What we mean by the term was called by the Greeks harmonics, which means the art of fitting, that is, adjusting the intervals in a scale, in the strings of a lyre. The scale of Pythagoras had seven notes, corresponding with the seven strings of his lyre, and he professed to derive his idea of music from the music of the spheres. The sun revolving round the earth was to him the chief planet, and was represented by the middle string of the lyre which was considered the keynote, corresponding with A in the modern scale. On one side were strings representing Mercury, Venus and the Moon, on the other side three more corresponding with Mars, Jupiter and Saturn. It is said that Pythagoras discovered the ratios of the perfect intervals from hearing blacksmiths striking an anvil with hammers of different weights. Aristoxenus (B.C. 300) discovered the difference between the major and

minor tones and has been called "the father of temperament." Claudius Ptolemy (B.C. 150) demonstrated the musical axiom which obtains in modern times that the major tone should be below the minor.

The Greeks had four modes or scales, the Dorian, the Phrygian, the Lydian, and the Mixolydian. The Dorian was set in the key of F natural, and the rest were distinguished by analogous differences.

The ancient Greeks were passionately fond of music, and elaborate treatises were written by them on the science and art. They did not understand harmony, and Aristotle (384 B.C.) speaks of the only chorus singing known as that of men singing a melody an eighth lower than it was sung by boys, which of course would be unison. Music was employed at Athens by wandering epic minstrels; it was also common in religious ceremonies, and to regulate the movements of the army. It formed part of the drama. We are told that Æschylus, the father of tragedy, composed the music for his own dramas and that Sophocles accompanied on the lyre the performance of one of his plays.

Greek Philosophy, the various speculations of the ancient Greeks with regard to the origin of things. This is but a partial description of the intellectual efforts made by the keen and powerful minds of the ancient world to solve those problems which science now-a-days is so eagerly investigating. The origin of Greek philosophy was the gradual disbelief that had seized men's minds as to the truth of the ancient poetical cosmogonies, and antique mythologies of religion. Faith was dead and reason had awakened. In the 7th century before our era, in the flourishing city of Miletus, capital of the Ionian colony, the first Greek philosopher propounded the question which is still being put, What is the basic substratum of all phenomena? In our own days Huxley called it protoplasm; Herbert Spencer said it was force. Thales of Miletus (636 B.C.) declared it was water, which to him seemed to permeate and give life to all things. Thales was the first of the Greek physicists, or materialists, and was considered one of the Seven Wise Men of Greece. He was the founder of the Ionian School of Philosophy. He was succeeded in the long line of philosophical inquirers by Anaximenes (529 B.C.): who looking for the first element, the first cause, found it in air. Air was universal and must be the parent of all things. It was the breath of life and must therefore be the source of it. Diogenes of Apollonia (460 B.C.) fixed upon a higher notion as the first cause of things. He saw the ruling race of mankind prevailed over nature by their intelligence. He decided that intelligence was the cause and foundation of all things. In these speculations as to the nature of the universe and its origin we come upon two remarkable men, Anaximander of Miletus (610 B.C.) and Pythagoras, who invented the word philosophy. The former taught that all existence came from the infinite—a vague term, which did not mean the infinite intelligence but the infinite existence. Pythagoras said that number was the first thing, from which all else proceeded—a metaphysical abstraction, which almost defies analysis. Aristotle says the Pythagoreans "taught that number was the beginning of things, the cause of their mate-

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rial existence, and of their modifications and different states."

The school of Eleatics is chiefly represented by the poet Xenophanes (620 B.C.). His philosophic creed is thus described by Aristotle: "Casting his eyes upward at the immensity of heaven, he declared that *The One* was God." Reason and imagination led this thinker to become at once a Monotheist and a Pantheist. Parmenides who was born (536 B.C.) at Elea, a city which gave its name to Eleatics, was the first to make the great distinction between truth and opinion, between the deductions of reason and the impressions of sense. He made being the basis of things, for non-being was impossible—a discovery which at that stage in philosophical speculation was of great importance. Zeno, another Eleatic, b. 500 B.C., who was the inventor of logic, was persecuted and put to death for free-thinking, and was a follower and disciple of Parmenides. Plato says that the master proved the existence of the one; the disciple established the non-existence of the many. He preserved his master's distinction between truth and opinion. "Your senses," he would say, "tell you that there are many things existing; reason avers that there is but one."

A contemporary of Zeno was a man who began at Ephesus those speculations as to the origin of the universe to which as preliminary he added a theory on the origin of knowledge. This was Heraclitus (503 B.C.). He was a disciple of Xenophanes, and taught that fire is the origin of everything, and there is no existence, but only change; things cannot be said to be, but only to be becoming; processes and not states formed the mode of existence. We cannot know or name anything with truth, for as we look at it, it changes, and is something different from what we thought it.

Anaxagoras came from Clazomenæ to Athens just when the age of Pericles was dawning; he had indeed Pericles, Euripides, and Socrates as his pupils. He attacked the patriotic religion of the proud city and was banished to Lampsacus. He thought that all sense—knowledge—was delusive until corrected by reason. He believed that intelligence was the creative and regulating influence of the universe. Things as they are were brought about by the concourse of infinite atoms; but these atoms were of all sorts, and that like was united to like in an infinite series of movement and combination; gold by the union of gold atoms that had existed from eternity, fires from fire atoms, air from atoms of air. These atoms were the famous *homœomeriæ* spoken of and condemned by Aristotle. Empedocles (444 B.C.) was of the great city of Agrigentum; in his views of knowledge he belonged to the Eleatics, and maintained that the senses were fallible, while reason was a sure guide to truth. He was a poet and declaimed against anthropomorphic ideas of deity. He gathered in one the doctrines of the Ionian physicists declaring the primary elements were four, namely, earth, air, fire and water. Love was the formative principle of things, hate the dissolver and destroyer. One was harmony, the other discord, and God is the One, "a sphere fixed in the bosom of harmony, rejoicing in calm rest."

Democritus of Abdera (460 B.C.) was a rich man who entertained Xerxes at his house. He

went one step further than Anaxagoras, and almost entered the circle of our modern science by teaching the atomic theory, namely that everything in the world is the result of a fortuitous concourse of atoms, all of the same substance, but making various things through the various forms they take in uniting. Color, sweetness, cold, are the result not of substances essentially differing; all is form.

All attempts had so far failed to solve the problems of the material world, and of human knowledge. Many theories were put forth, none were universally accepted, although they were each discussed. This brought the Sophists on to the stage of philosophy—men who taught the arts of discussion, not of investigation. One of the greatest of them was Protagoras. He was a disciple of Democritus, and taught that opinion was everything, "Man, the individual man, each for himself, is the measure of all things." The Sophists were the first skeptics, but a new epoch rose with Socrates (469 B.C.). He was the most remarkable man in all the Greek world; for his love of disputation he was classed by some with the Sophists, for his ridicule of traditional views in religion and physics, he was condemned to death—yet he succeeded in substituting morals for physics as the subject of philosophy. He first gave to philosophical methods the definition and the inductive argument, or reasoning by analogy. One of his disciples, Aristippus of Cyrene, while he followed the method of his master, founded the Cyrenaic school which taught that pleasure was the criterion of the true: Socrates had taught that the good as judged by the individual conscience was that criterion. Then followed the Cynics, under Antisthenes, who went to the opposite extreme to Aristippus, became an ostentatious ascetic, and in this was followed by Diogenes of Sinope, who made his home in a cask or tun, and tried to set the example of a rugged virtue, which is misanthropic, but triumphant over bodily appetite. It was left to Plato to exhibit the complete adoption and application of the Socratic method. He believed that in each man resided the power of detecting the truth, from having seen the perfection of things, in an ideal world during a previous state of existence; he could judge of the good and the beautiful here from his memory of what their perfect archetypes were. His voluminous writings enable us to judge both of his ethical and political system, but they both fail in practicality. His most famous pupil was Aristotle (384 B.C.), a man of encyclopedic mind, the first scientific observer, the inventor of the syllogism. Plato was an idealist and a rationalist; Aristotle a materialist and an empiric. The one trusted to reason, the other to experience. Aristotle always argued against the ideal theory of his master, and deduced his conclusions from things as he saw them. He invented grammar as well as logic, and was in himself an epitome of the philosophic learning of his predecessors. But by reasoning from experience he had opened the way for the skeptics, of whom the first was Pyrrho, who taught that there is no criterion of truth. Phenomena are mere appearances, how can we prove they are anything else? This was what in modern times is called agnosticism, for we cannot prove and therefore cannot know the truth of anything we see. But after this suicide of philosophy in the school of Pyrrho, she revived again as a moral mentor in the person of Ep-

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curus, of Samos (342 B.C.). He taught the highest good is pleasure; this is the moral end of existence. He was controverted by the Stoics. Zeno was their leader, a man of stern unbending character and abstemious life, whose aim was to show that virtue consisted in manhood, and manhood in the power to endure hardness and to despise the body. Skepticism, indifference, sensuality and epicurean softness were not to be combated by the vague dreams of Plato, or the cumbrous system of Aristotle. The Stoic attempted to meet the growing decadence by an exactly opposite self-denial and impassive reserve. But Stoicism was egotistic; its aim was the repression of feeling, it was apathy, death in life. The last struggle of Greek philosophy to dominate the mind of society was witnessed in the rise of the New Platonists and their New Academy. Carneades (213 B.C.) was their most illustrious representative, and he was the type of a school that took up the doctrines of Plato, expanded and enlarged them until the time when Christianity appeared, and faith, not reason, as in the old days seven hundred years before, dominated the world of opinion. See *PHILOSOPHY, HISTORY OF*.

Greek Theatre, First in America, the gift of William R. Hearst to the University of California, is exactly similar in its proportions to the famous theatre of Dionysus at Athens.

The structure was used for the first time at the University of California commencement 1903 when President Roosevelt was the orator of the day. It was then learned that every one of the 8,000 spectators seated in the theatre could hear with perfect distinctness.

No roof shuts out the sunlight or starlight from the audience. Situated right in the heart of magnificent scenery, tall trees towering up above the walls on all sides and the building itself being an architectural gem, it will readily be seen that very little stage scenery will be needed when presenting the early plays which will be given by university students and the leading actors of the world as soon as all is ready.

The entire structure is white; the hangings will be a blending of the Greek and Roman colors; but there will be very few decorations used aside from architectural carvings, the splendor of the place being in its dimensions and simplicity.

Though this theatre is modeled in a general way after the ancient classic buildings of a similar character, no single historic example has been literally followed. The theatre at Epidaurus, in Greece, however, offers many points of similarity, notably in the difference of slope between the upper tiers of seats and the inner and lower portions of the auditorium. The new theatre is of approximately the same size as the larger theatre at Pompeii.

The building is, as a whole, made up of two separate and distinct parts, namely, the stage, corresponding to the ancient logeion, and the auditorium.

The floor of the stage is 133 feet wide and 28 feet deep. It is entirely open toward the auditorium and surrounded on the other three sides by a wall 42 feet in height. This wall, which corresponds with the ancient skene, is enriched by a complete classic order of Greek Doric columns with stylobate and entablature, the ends of the side walls toward the auditorium forming two massive pylons. Five openings pierce the

wall, the entrance in the centre of the back of the stage being the most important—the so-called royal door of the ancients. This is flanked by two minor doors to the right and left, the two remaining openings occurring on the return walls at either end of the stage.

The auditorium or theatre proper is semi-circular in form, 254 feet in diameter, and is divided into two concentric series or tiers of seats. The first series is arranged about a level circle 50 feet in diameter and $5\frac{1}{2}$ feet below the stage, which corresponds to the space anciently devoted to the chorus, orchestra, etc.

From this circle the receding rows of seats step up gradually until the stage level is reached at a circle corresponding in diameter with the terminal pylons of the stage wall. This line is marked architecturally by a passage, anciently named the diazoma or diodos, running around the semicircle of seats midway between the orchestra and the topmost circle. The diazoma is protected on its outer side by a wall, beyond which the seats step up more steeply, approximately at an angle of 30 degrees with the horizontal, to the outer limit of the theatre.

It is estimated that more than 7,000 persons can be seated in the theatre proper. The stage will accommodate some 600 more, a number which can be readily added to by the temporary extension of the stage floor toward the auditorium.

Greeley, Horace, American journalist: b. Amherst, N. H., 3 Feb. 1811; d. Pleasantville, N. Y., 29 Nov. 1872. More than 30 years after his death, Horace Greeley's name remains at the head of the roll of American journalists. Successors in the primacy of current discussion may surpass him, as doubtless some of them already have, in consistency and learning, but hardly in the chief essentials of a journalistic style; others may exert a more salutary influence, if not so personally diffused; but in the respect of high ideals, courage, intellectual force, and personal magnetism, the qualities which impel a man of letters to be also a man of action, Horace Greeley was of heroic mold. He was no pop-gun journalist firing from a sky-sanctum, but a face-to-face champion in the arena of public affairs, laying about him with pen and speech like an ancient Bayard with his sword. The battles he fought for humanity, and the blows he gave and received, have made him for all time the epic figure of the American press.

Born in rural New Hampshire, of English and Scotch-Irish descent, he epitomized his heritage and his attainment in the dedication of his autobiography "To our American boys, who, born in poverty, cradled in obscurity, and early called from school to rugged labor, are seeking to convert obstacle into opportunity, and wrest achievement from difficulty."

Though physically a weak child, his intellect was strong, and when near his tenth year his father removed to Vermont, the boy took with him the reputation of a mental prodigy; so, with little schooling and much reading, he was thought when 14 to be a fit apprentice to a printer, setting forth four years later as a journeyman. His parents had moved to western Pennsylvania, and he followed; but after a desultory practice of his art he came to the metropolis on August 17, 1831, with \$10 in his pocket, and so rustic in dress and manners as to fall under suspicion of being a runaway apprentice. Later

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In life, at least, his face and his figure would have lent distinction to the utmost elegance of style: but his dress was so careless even after the long period of comparative poverty was passed, that the peculiarity became one of his distinguishing features as a public character; and to the last there were friends of little discernment who thought this eccentricity was studied affectation: but manifestly his dress, like his unkempt handwriting was the unconscious expression of a spirit so concentrated on the intellectual interests of its life as to be oblivious to mere appearances.

After 18 months of dubious success in New York as a journeyman, in his 21st year, he joined a friend in setting up a modest printing-office, which on March 22, 1834, issued the 'New Yorker,' a literary weekly in the general style of Willis' 'Mirror,' under the firm name of H. Greeley & Company. For four years the young printer showed his editorial aptitude to such good effect that in 1838 he was asked to conduct the 'Jeffersonian,' a Whig campaign paper. This was so effective that in 1840 he was encouraged to edit and publish the 'Log-Cabin,' a weekly which gained a circulation of 80,000, brought him a reputation as a political writer, and active participation in politics with the Whig leaders, Gov. Seward and Thurlow Weed. It contributed much to the election of Gen. Harrison, but very little to the purse of the ambitious editor. On April 10 of the following year, 1841, he issued the first number of the *New York Tribune*, as a Whig daily of independent spirit. He was still editing the 'New Yorker' and the 'Log-Cabin,' both of which were soon discontinued, the 'Weekly Tribune' in a way taking their place. Though the 'New Yorker' had brought him literary reputation, it had not been profitable, because of uncollectible bills which at the end amounted to \$10,000. Still, at the outset of the *Tribune* he was able to count \$2,000 to his credit in cash and material. He was then 30 years of age, and for 30 years thereafter the paper grew steadily in circulation, influence, and profit, until, a few weeks after his death, a sale of the majority interest indicated that the "good-will" of the *Tribune*, aside from its material and real estate, was held to be worth about a million dollars. The Greeley interest was then small, since he had parted with most of it to sustain his generous methods of giving and lending.

He had great capacity for literary work, and when absent for travel or business was a copious contributor to his paper. To his rather delicate physical habit was perhaps due his distaste for all stimulants, alcoholic or otherwise, and his adherence through life to the vegetarian doctrines of Dr. Graham; another follower of the latter being his wife, Mary Young Cheney, also a writer, whom he married in 1836. His moderate advocacy of temperance in food and drink, coupled with his then unorthodox denial of eternal punishment, helped to identify him in the public mind with most of the "isms" of the time, including Fourierism and spiritualism; when in fact his mind and his paper were merely open to free inquiry, and were active in exposing vagaries of opinion wherever manifested. Protection to American industry, and abolitionism, were the only varieties which he accepted without qualification: and while the pro-slavery party

detested him as a dangerous agitator, it is possible at this day even from their point of view to admire the moderation, the candor, and the gentle humanity of his treatment of the slavery question. In all issues concerning the practical affairs of life, like marriage and divorce, he was guided by rare common-sense, and usually his arguments were scholarly and moderate; but in matters of personal controversy he was distinctly human, uniting with a taste for the intellectual fray a command of facts, and a force and pungency of presentation, which never seem admirable in an opponent.

He was in great demand as a lecturer and as a speaker at agricultural fairs, his addresses always being distinguished by a desire to be helpful to working humanity and by elevated motives. Though not a jester, genial humor and intellectual exchange were characteristic of his social intercourse. His books, with one or two exceptions, were collections of his addresses and newspaper articles. His first book, 'Hints Toward Reforms,' appeared in 1850, and was followed by: 'Glances at Europe' (1851); 'A History of the Struggle for Slavery Extension or Restriction' (1856); 'The Overland Journey to California' (1859); 'An Address on Success in Business' (1867); 'Recollections of a Busy Life,' formed on a series of articles in the New York 'Ledger' (1869); 'Essays Designed to Elucidate the Science of Political Economy' (1870); 'Letters from Texas and the Lower Mississippi, and an Address to the Farmers of Texas' (1871); 'What I Know of Farming' (1871); and 'The American Conflict,' written as a book, the first volume appearing in 1864 and the second in 1867. This work on the Civil War is remarkable, when considered in the light of his purpose to show "the inevitable sequence whereby ideas proved the germ of events"; but it was hastily prepared, and while strikingly accurate in the large sense, will not bear scrutiny in some of the minor details of war history.

Neither his political friends, nor his party, nor the causes he espoused, could hold him to a course of partisan loyalty contrary to his own convictions of right and duty. As a member of the Seward-Weed-Greeley "triumvirate," he was often a thorn in the flesh of the senior members; his letter of Nov. 11, 1854, dissolving "the political firm," being one of the frankest documents in the history of American politics. During the Civil War he occasionally embarrassed Mr. Lincoln's administration by what seemed then to be untimely cries of "On to Richmond!" immediate emancipation, and peace. On the whole, his influence for the Union cause was powerful; but when, the War being over, he advocated general amnesty, and finally as an object lesson went on the bail bond of Jefferson Davis, he lost the support of a large body of his most ardent anti-slavery admirers. The clamor against him called forth a characteristic defiance in his letter to members of the Union League Club, who were seeking to discipline him. Having further alienated the Republican party by his general attitude in "reconstruction" matters, he became the logical candidate for the Presidency, in 1872, of the Democrats at Baltimore and the Liberal Republicans at Cincinnati, in opposition to a second term for Gen. Grant. Though personally he made a brilliant canvass,

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the influences at work in his favor were inharmonious and disintegrating, and the result was a most humiliating defeat. This he appeared to bear with mental buoyancy, despite the affliction of his wife's death, which occurred a week before the election, he having left the stump in September to watch unremittingly at her bedside. On November 6, the day after his defeat, he resumed the editorship of the *Tribune*, which six months before he had relinquished to Whitelaw Reid. Thereafter he contributed to only four issues of the paper, for the strain of his domestic and political misfortunes had aggravated his tendency to insomnia; on the 12th he was seriously ill, and on the 20th he succumbed to inflammation of the brain. The last few months of his eventful career supplied most of the elements essential to a Greek tragedy. On December 23, the *Tribune* having been reorganized, with Mr. Reid in permanent control, there first appeared at the head of the editorial page the line "Founded by Horace Greeley," as a memorial to the great journalist and reformer. A bronze statue has been erected in the portal of the new *Tribune* office, and another statue in the angle made by Broadway and Sixth Avenue, appropriately named "Greeley Square," after the man who was second to no other citizen in establishing the intellectual ascendancy of the metropolis.

CLARENCE CLOUGH BUEL.

Greeley, Colo., city, county-seat of Weld County; on the Cache la Poudre River, the Union P. and the C. & S. Railroads; about 50 miles north of Denver. The place was settled in 1870 by the "Greeley Colony" (named after Horace Greeley), made up mainly of New England people. By irrigation they have made of the almost barren region an excellent agricultural country. It is the seat of a State Normal School. The chief manufactures are flour, beet-sugar, and lumber. Its trade is in its manufactured articles, also sheep, cattle, grain, and vegetables. Pop. (1910) 8,179.

Greely, Adolphus Washington, American Arctic explorer: b. Newburyport, Mass., 27 March 1844. After receiving a high school education he enlisted as a private in the 19th Massachusetts volunteer infantry, serving in the Civil War from 1861 to 1865. He entered the regular army in 1867 as second lieutenant and was appointed to the signal service. In 1881 he was put in command of an Arctic expedition, organized to carry out the plan of establishing circumpolar stations in accordance with the recommendations of the International Geographical Congress held at Hamburg in 1879. The exploring party made their headquarters for two years at Discovery Harbor, Grinnell Land. In an expedition made by a detailed party, the highest point north attained up to that date, 83° 24', was reached. On his way back he reached Cape Sabine with great difficulty, and during the winter of 1883 lost, through cold and famine, all but seven of his twenty-five companions. Meanwhile Com. Winfield S. Schley had been despatched on a relief expedition, and in June 1884 rescued them at Cape Sabine. From his services to geographical science Lieutenant Greely was awarded the Founder's Medal of the Royal Geographical Society, and the Roquette Medal by the Société de Géographie de Paris. He was promoted captain in the United States Army, in 1887 became chief signal officer, with the rank of brig-

adier-general; in 1906 major-general; and retired 27 March 1908. Consult: Greely 'Three Years of Arctic Service' (1886); Schley, 'The Rescue of Greely' (1885).

Green, Alice Sophia Amelia (STOPFORD), English historian: b. Kells, Ireland, 1849. She was privately educated. In 1877 she was married to J. R. Green (q.v.) the well-known historian. She collaborated with him in 'A Short Geography of the British Islands' (1879), edited his 'Conquest of England' (1883), prepared a revised edition (1888) and, with Miss K. Norgate, a finely illustrated edition (1892) of the 'Short History of the English People.' Her original works are 'Henry II.' (1888) and 'Town Life in the Fifteenth Century' (1894).

Green, Andrew Haswell, American lawyer: b. Worcester, Mass., 6 Oct. 1820; d. 13 Nov. 1903. He studied law, practised his profession in New York, and was there president of the board of commissioners of education, and comptroller (1871-6). In the latter capacity he re-established the municipal credit, seriously impaired by the embezzlements of the Tweed ring. He originated in 1868 the plan for Greater New York, executed in 1897, and also devised the plan for the consolidation of the Astor, Lenox, and Tilden foundations as the New York Public Library. He also assisted in establishing the American Museum of Natural History and the Metropolitan Museum of Art, and founded and became president of the New York Zoological Society. He was shot by Cornelius M. Williams, a negro, pronounced insane. It developed that he lost his life through resemblance to another against whom the assassin had a supposed grievance.

Green, Anna Katharine. See ROHLFS, ANNA K. G.

Green, Ashbel, American Presbyterian clergyman: b. 6 July 1762; d. 19 May 1848. He was graduated from the College of New Jersey (now Princeton University) in 1783, and appointed tutor and subsequently professor of mathematics and natural philosophy in that institution, which latter position he held for a year and a half. In 1786 he was licensed to preach and took up ministerial work in Philadelphia. From 1792 to 1800 he was chaplain to Congress, and in 1809 took a prominent part in forming the Philadelphia Bible Society, the earliest institution of the kind in the United States. He drafted the constitution of the Princeton theological seminary, of which he was one of the originators, and in 1812 was elected president of Princeton College. In 1822 he resigned this office and returned to Philadelphia to edit the 'Christian Advocate,' a religious monthly. For half a century he was one of the leading men in the Presbyterian Church. Among his many writings are 'Discourse Delivered in the College of New Jersey, with a History of the College' (1822); 'History of Presbyterian Missions'; 'Lectures on the Shorter Catechism.'

Green, Bartholomew, American publisher: b. Cambridge, Mass., 1666; d. 1732. He published the first newspaper that appeared in the American colonies, and succeeding to his father's business at Cambridge extended it at Boston, where the office of the 'Boston News Letter' was situated. The proprietor and editor was John Campbell, postmaster of Boston. He event-

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ually bought in the paper, which became notable for outspokenness on topics of religion and politics.

Green, Beriah, American abolitionist: b. New York State 1794; d. 1874. He was educated at Middlebury College, Vermont, became professor of sacred literature in Western Reserve College in 1821, but was compelled to resign in a few months through the opposition aroused by his anti-slavery views. He was for many years president of the Oneida Institute, Ohio. He was a great friend of William Lloyd Garrison, and exerted a wide influence in abolitionist circles. Among his writings are 'History of the Quakers' (1823).

Green, Duff, American politician and journalist: b. Woodford County, Ky., 1791; d. Dalton, Ga., 1875. He served with the Kentucky militia in the War of 1812; after the admission of Missouri as a State was appointed State Senator (1823), and became editor and proprietor of the St. Louis *Enquirer*. In 1825 he removed to Washington, D. C., where he purchased the *United States Telegraph*. This became the administration organ, and Green rose to high favor with President Jackson. He was a member of the "Kitchen Cabinet." After the rupture between Calhoun and Jackson, the *Telegraph* as the organ of the nullificationists bitterly attacked Jackson. After some years spent in Europe he returned to the United States (1844) and edited a short-lived newspaper in New York. During the latter years of his life he was actively engaged in promoting the development of the South, and was one of the founders of the town of Dalton, Ga.

Green, Hetty Howland Robinson, American financier: b. New Bedford, Mass., 21 Nov. 1835. She is the richest woman in America and probably the boldest and ablest woman financier of her time. Although she has an interest in nearly every large corporation and important enterprise in the world, she manages personally her own property in stocks, bonds, and real estate in Chicago, New York and elsewhere.

Green, Jacob, American Presbyterian clergyman: b. Malden, Mass., 1722; d. 1796. He became president of the College of New Jersey in 1757, and in 1775, as a member of the New Jersey Provincial Congress, was chairman of the committee chosen to prepare a State Constitution. He suggested in print a scheme for the redemption of the Continental currency, closely resembling that which Congress later adopted.

Green, John Cleve, American merchant and philanthropist: b. Lawrenceville, Mercer County, N. J., 14 April 1800; d. New York 28 April 1875. He entered a counting-house in New York, went as supercargo to South America and China, and in 1833 became a member of the firm of Russell & Co. at Canton. In 1839 he returned to New York, where he continued in the Chinese trade. For many years he was a director of the Chamber of Commerce, and officially connected with numerous public and charitable institutions. He was liberal in his gifts, particularly to New York University, and Princeton University. At Princeton he established (1873) the John C. Green School of Science by the gift of \$50,000, subsequently increased by the residuary legatees. In this school instruction is given in general science, civil engineering, and electrical engineering. The courses are four

years in length and lead to the degrees of bachelor of science, civil engineer and master of science. In 1902-3 the number of students in this department was 505. The endowed proprietary school for boys at Lawrenceville, N. J. was re-established in 1882 upon a gift from the executors of his estate known as 'The John C. Greer Foundation.'

Green, John Richard, English historian: b. Oxford 1837; d. Mentone, France, 7 May 1883. He was graduated in 1859 from Jesus College, Oxford, where, since the study of modern history had not yet taken any considerable place in the university the officers failed of sympathy with his preference for Matthew Paris to the classics. In 1860 he was ordained deacon and became curate of St. Barnabas, London, in 1863 was appointed to Holy Trinity, Hoxton, and in 1866 to St. Philip's, Stepney. Failing health and increasingly liberal views caused him to withdraw from clerical life, and from 1869 he was librarian at Lambeth. His first literary work of importance consisted of articles, especially brief essays, on historical subjects, in the 'Saturday Review.' In 1874, after having been twice rewritten, his 'Short History of the English People' appeared. This work unified English history as no other had yet done. 'What Macaulay had done for a period of English history,' says Creighton, 'Green did for it as a whole.' Green's purpose was to exhibit the development of popular life by a description of the leading manifestations of social progress. The book was skilful in arrangement and artistic in style, and met with an instant and large success. The author expanded it into his 'History of the English People' (1877-80), not only to secure greater fulness but also to defend views merely stated in the smaller work. He then attempted a history for scholars, of which but two parts were published—'The Making of England' (1882), which extends from Britain as left by the Romans to the consolidation under Egbert, and secured his fame as a critical historian, particularly through his method of employing archaeology for the purposes of history; and 'The Conquest of England' (1883), which continued the narrative to the arrival of the Normans. Green's influence on historical studies in England was very great, and his 'Short History' and 'History' still hold a foremost rank. The Oxford Historical Society and the 'English Historical Review' were originally suggested by him; and he further published: 'Stray Studies in England and Italy' (1876), a reprint of early papers; 'Readings from English History' (1879), a series of extracts; 'A Short Geography of the British Isles' (1880); and an edition of Addison's 'Essays' (1881). His 'Letters' were published in 1901.

Green, Joseph, American poet: b. Boston, Mass., 1706; d. London, England, 11 Dec. 1780. He was graduated at Harvard 1726, and was famous for his wit and satirical powers. During the War of the Revolution he was prominent on the Loyalist side. His works include: 'The Wonderful Lament of Old Mr. Tenor' (1744); 'Poems and Satires' (1780).

Green, Seth, American pisciculturist: b. Irondequoit, N. Y., 19 March 1817; d. Rochester, N. Y., 20 Aug. 1888. He learned the natural history necessary for his profession from observation and private reading, and began his

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life's work by the artificial hatching of trout roe. He was looked upon as the leading expert in this department of fish culture, but his first great triumph in new fields came with his success in the reproduction of shad. The Seth Green shad-hatching box was invented in 1867, and, although it has been superseded, by this device shad culture was first demonstrated to be possible and its inventor must be looked upon as the pioneer in this difficult department of pisciculture. The Connecticut River was restocked by means of this invention. In 1868 he was made fish commissioner for the State of New York, and the following year undertook the artificial reproduction of whitefish. He was successful in his experiments, and was acknowledged as one of the fathers of fish culture in the United States. From 1870 until his death he was superintendent of the state hatchery at Caledonia, N. Y.

Green, Thomas Hill, English philosopher: b. Birkin, Yorkshire, 7 April 1836; d. Oxford, 15 March 1882. He was educated at Rugby and Oxford; was elected fellow at Balliol in 1862, the first lay tutor on that foundation (1867), and in 1878 Whyte professor of moral philosophy in the university. His principal work as a philosopher was the foundation of the so-called Neo-Hegelian School. He is supposed to have been taken by Mrs. Ward as a model for her Mr. Gray in 'Robert Elsmere'; but the resemblance is by no means complete, as Mr. Gray's work is undoubtedly, as he appears in 'Robert Elsmere,' rather that of a destructive literary critic than a constructive philosopher. His works include: 'Introduction to Hume's Treatise of Human Nature' (1874); and 'Prolegomena to Ethics' (1883.)

Green Bay, Wis., a city and county-seat of Brown County, situated at the head or southern point of the bay of the same name, and at the mouth of the Fox River, on the Chicago & Northwestern, Chicago, Milwaukee & St. Paul, the Green Bay & Western R. R.'s.

Commerce and Industry.—Green Bay has an extensive commerce. Twenty-four passenger trains arrive daily over the four railroads entering the city. An extensive lake traffic is also carried on, the harbor, through government appropriations, having been made accessible to the largest vessels upon the Great Lakes. Coal constitutes the largest single import, Green Bay being an advantageous distributing point. The largest export by way of the lakes is grain, although much lumber has hitherto been shipped out. A line of excursion steamers is also run to nearby summer resorts and to Mackinac and the "Soo." The city is provided with a complete electric railway system, including an interurban line up the Fox River valley to Kaukauna, where a junction is made with another electric line passing through Appleton, Neenah, Oshkosh and Fond du Lac. A light and power plant furnishes gas for lighting and heating and electricity for light and power, many electric motors now being in use. There are a number of manufacturing plants—3 large breweries, 2 paper mills and 1 sulphite mill, 2 large saw mills, 2 planing mills, 1 very large canning factory, 1 shoe factory, 1 glove factory, 1 pure milk factory, 1 furniture factory, 2 woodenware factories, 3 machine shops, 1 candy and biscuit factory, 1 pickle factory, 1 coffin factory, 1 carriage factory, 1 cornice factory,

1 paper-box factory. Several jobbing and wholesale houses do a large business, the most important being a grocery house, a hardware house, and a crockery house. An extensive fish-shipping business is also carried on. Water is supplied from artesian wells by a private company.

Educational Institutions, Etc.—Green Bay has a number of fine public buildings, the Kellogg library, the Federal Buildings, Saint Joseph's Academy, three Hospitals, and just outside the city limits the State Reform School. The public school system had (1910) 2 high schools and 13 ward schools, employing 106 teachers. There are also several parish schools, graded in the same manner as the public schools. There are 6 Roman Catholic churches, 2 Baptist 2 Congregational, 1 Episcopal, 2 Evangelical, 2 Lutheran, 4 Methodist, 2 Moravian, 2 Presbyterian, and 1 Christian Scientist.

History.—Green Bay, the oldest town in Wisconsin, was first visited in 1634 by Jean Nicolle, who had been sent by Champlain, governor of New France, to find the rumored short route to China. The site was a favorable one for an Indian village as well as a landing place for explorers and missionaries. It is known that Marquette, Joliet, Allouez, and Tonti spent considerable time here. The town was therefore settled by the French, who impressed their character upon it for over 200 years, although it fell into the hands of the English at the close of the French and Indian war in 1763. In 1816 the Americans established a fort on the opposite side of the river, known as Fort Howard, around which a prosperous town of the same name grew up. In 1895 Fort Howard was annexed to Green Bay, and is now known as the West-Side.

Government, Etc.—The government of the city is administered by a mayor and common council, the latter consisting of sixteen members, elected for two years, two from each ward. Assessed valuation: Lots exclusive of buildings, \$4,150,235; buildings, \$4,279,740; personal property, \$2,827,140; total (1910), \$11,466,285. Pop. (1910) 25,236.

A. W. BURTON,
Superintendent of Schools.

Green Bay, an arm of Lake Michigan, on the southwestern coast of the upper peninsula of Michigan and the eastern coast of Wisconsin. It is 120 miles long, from 10 to 20 miles wide, has an average depth of about 100 feet. Fox River, the outlet of Lake Winnebago, enters the bay at its head, at the city of Green Bay. The bay is navigable for the largest lake steamers. The largest cities on the bay are Green Bay and Marinette, in Wisconsin, and Menominee and Escanaba in Michigan.

Green Cove Springs, Fla., town, county-seat of Clay County; on the St. John's River, the Jacksonville, T. & K. W. railroad. It contains a warm sulphur spring noted for its medicinal properties. The trade is chiefly in fruits, vegetables, and lumber. Pop. (1910) 1,310.

Green Island, N. Y., a village of Albany County, on an island in the Hudson River opposite Troy, on the Delaware & H. and the New York C. & H. R. R.R.'s. It is connected with Watervliet and Troy by bridges; and has iron manufactories, machine shops and railroad car shops. Pop. (1910) 4,737.

GREEN MANURING—GREENAWAY

Green Manuring, the agricultural practice of plowing under crops while succulent in order that they may enrich the surface layer by their decay. It is of ancient origin and wide popularity, especially in mild climates; less in tropical than it should be. The objects gained are the opening of the soil and especially the subsoil by the roots of deep feeding plants; the raising of plant food from the lower strata to the surface layer and the saving of available plant food in the surface layer, material that would leach away beyond the reach of shallow-rooted plants; the addition of humus to the soil by the decay of the plants; and, with certain crops, the addition of nitrogenous foods obtained from the air. As the plants decay they also act upon insoluble plant food in the soil and make it available. They belong to two classes: (1) shallow-rooted plants such as rye, buckwheat, mustard, rape, etc., which are specially useful on hard and poor soils open the way for more exacting crops; (2) deep-rooted plants such as clover, cow-pea, velvet bean, vetch and other leguminous plants which are still further useful because of their power of obtaining nitrogen from the air. See CLOVER; FERTILIZERS; LEGUMINOUS PLANTS; MANURES AND MANURING; ROOT-TUBERCLES; SOIL, and articles on the crops mentioned.

Green Monkeys, three similar species of small African monkeys, often seen in menageries, and representing the genus *Cercopithecus*, may properly be called green monkeys because of the prevailing tint of their fur. The one most commonly seen is *C. callitrichus*, the size of a cat, and remarkable for its unbroken silence. The vervet (*C. lalandi*) is smaller, grayish green, reddish white on the cheeks, throat and underparts, while the face, paws and end of the tail are jet black. It is common all over South Africa, where no other species of its large genus are found. The grivet (*C. griseoviridis*) is speckled olive-green, with a whitish forehead, chin and rump; it dwells in Abyssinia and is not numerous. All these monkeys, at least when young, are exceedingly docile and good-natured in captivity.

Green Mountain Boys, the regiments of Vermont settlers raised to defend the New Hampshire grantees against the efforts of New York to oust them or collect quit-rents, and later for service in the Revolution. See ALLEN, ETHAN.

Green Mountain State, a popular name for the State of Vermont, from its being crossed by the Green Mountains. See GREEN MOUNTAINS; VERMONT.

Green Mountains, a range belonging to the Appalachian system properly extending from near Long Island Sound through the western part of Connecticut and Massachusetts, into Vermont and Canada. In the State of Vermont the range is known as Green Mountains; but south, in Massachusetts and Connecticut, it is called by the names Berkshire Hills, Taconic Mountains, and Hoosac Mountains. The peaks of this range, one of the oldest in North America, have been worn down by erosion and weathering, until in many places they have become low, round hills. Their greatest elevation is in Vermont; Mount Killington, Mansfield, Camels Hump, Lincoln, and Jay being the highest. Summit, a hamlet in the town of Mount Holly, in Rutland County,

is the highest point crossed by a railroad. Some of the best building stone in the country is obtained from the Green Mountains. Granite and marble exist in large quantities, and on the western slope are layers of red sandstone. Iron and slate abound, and copper and manganese are found in several places. The range forms the divide between the basin of the Connecticut on the east and the Lake Champlain and Hudson River basins on the west. The rivers rising in the Green Mountains are short streams, but their water-power is abundant. In the fertile valleys are rich farms, and sheep and cattle are raised on the uplands. The hemlock, spruce, pine, and other evergreens which form striking parts of the forests, have given the name to this range. Hard wood trees and the sugar maple are found on both the east and west slopes of the mountains. The beauty of the scenery and the climate make the Green Mountains a place much frequented in summer by tourists.

Green River, in Kentucky, has its rise in Lincoln County, flows south and west to Adair County; west, a very irregular course, to Butler County; then northwest to the Ohio River which it enters a few miles above Evansville, Ind. It is about 350 miles long, and is navigable for small steamers for a distance of about 200 miles from the Ohio; but for a part of this distance artificial means have been used to make it navigable. In Edmonson County this river passes within 80 feet of the mouth of Mammoth Cave. The subterranean stream called Echo River, which is seen in connection with the Mammoth Cave, flows into Green River.

Green River, in Utah, has its rise in the western part of Wyoming, flows south and east into Colorado, south and west into Utah, then in a southern direction to the southeastern part of the State where it unites with the Grand to form the Colorado River. Major Powell (q.v.) and other explorers have passed through several of the remarkable cañons of this river. Its length is about 525 miles.

Green Snake, in the United States, a very slender, agile, harmless, grass-green, yellow-bellied serpent (*Liopeltis vernalis*), which is not only common in grassy places but in bushes, its color concealing it well in both places. It feeds mainly on insects. Several poisonous serpents of the far East, are called "green snakes" by English-speaking residents on account of their color.

Green Springs, Va., Battle of, 6 July 1781. Lafayette, reinforced by Steuben, was pressing close on Cornwallis' rear down York peninsula; and the advance-guard under Wayne came unexpectedly upon an entire division of the British at Green Springs, on the James River. Immediate retreat meaning destruction, he charged them so fiercely that Cornwallis, thinking the entire American army was upon him, merely repelled the assaulting party and drew off his men, while Wayne retreated in the other direction. The American loss was 145.

Green Vitriol. See COPPERAS.

Green'away, Kate, English artist: b. London 1846; d. there 8 Nov. 1901. She studied at Heatherley's, South Kensington, and the Slade School, and first exhibited in 1868 at the Dudley Gallery. For many years her work regularly appeared in the exhibitions of the Water Color

GREENBACK-LABOR PARTY — GREENBACKS

Society and the Academy. Her illustrations were widely published and popular in the United States as well as in Great Britain. She became especially famous for her pictures of child life, characterized by individuality of design, skillful coloring, and humorous touches. Her books include 'A Painting Book for Boys and Girls' and 'Kate Greenaway Birthday Book.'

Greenback-Labor Party, or National Party. The workingmen during the "panic years" (1874-8) increasingly resorted to political activity to right their grievances, and in Ohio in 1877 began to call their local organization the "National Party." In Massachusetts and Pennsylvania they fused with the Greenback Party (q.v.). On 22 Feb. 1878, at Toledo, Ohio, they held a convention which organized the fusion as the "National Party;" but the popular name for it was the old fusion name "Greenback-Labor." Their platform was the Greenback one, with planks against prison contract labor and in favor of legislation for shorter hours. The new organization awakened hopes in the hopeless minorities in several States where the majority, Republican or Democratic, could not be overturned; and they organized fusions with it, which raised it at once to a popular vote (apparently) of over 1,000,000, and elected 14 Congressmen. In the close States each old party kept its own vote, with a slight falling off to the new one. The party proper elected but two representatives, five of the 14 being really Republicans and seven Democrats. In 1880 (9-10 June) it held a national convention at Chicago, and nominated James B. Weaver of Iowa, and B. J. Chambers of Texas, for President and Vice-President; Chambers declined, but no substitute was nominated. The platform had all the old planks in substance, and new ones against Chinese immigration, land-grants to railroads, and favors to corporations and bondholders, and in favor of sanitary regulations for manufactories. The fusions had largely disappeared, and the popular vote sunk to 306,867, and the Congressmen to eight; four from Missouri, two from Maine, one from New York, and one from Texas. It retained its organization till 1884, when it fused with the Anti-Monopoly Party (q.v.) and nominated Benjamin F. Butler for the Presidency, polling in all 175,380 votes. It then practically disappeared.

Greenback Party (its own name INDEPENDENT PARTY), 1874-6. The prosperity of western agriculture during the War, due largely to the heavy government purchases and the payability of mortgages in depreciated paper, was attributed by a large section there to the plentifulness of the paper by itself; hence, when hard times had succeeded, it was believed that a fresh inflation of greenbacks would reproduce the same conditions. The chief obstacle to this was thought to be the eastern banking interests, which, having bought government bonds in greenbacks, had obtained the act of 1869 making them payable in coin whether so specified or not; and should have been forced to take what they gave, the more since paper was now at par and their bonds were not taxed. By 1868 the Ohio Democrats, led by George H. Pendleton, were insisting on the payment in greenbacks of all bonds not specifically payable in coin, as the 5-20's; this was called the "Ohio Idea." Western Democratic conventions placed this plank in their platforms for three

or four years, but the nomination of Greeley put an end to that in 1872. The revival of greenbackism is often attributed to the silver demonetization act of 1873; but in fact silver was above par at that time, the act drew no general attention, and but for the later fall in silver probably never would have done so. The real cause was the bringing forward of the Resumption Act, passed 14 Jan. 1875, to take effect 1879. On 25 Nov. 1874 a Greenback convention was held to protest against it, and adopted three resolutions — (1) that all bank and corporation currency should be withdrawn; (2) that no currency be allowed except government paper "based on the faith and resources of the nation," and exchangeable on demand for 3.65 per cent bonds; (3) that coin should be paid only for interest on the national debt, and for that part of the principal which promised it. Several Democratic conventions indorsed these; but in 1876 the prospect of the hard-money Tilden being the next Presidential candidate, led the party to form an organization of its own. At a convention at Indianapolis, 17 May, they nominated Peter Cooper of New York and Newton Booth of California for President and Vice-President; Booth declined, and Samuel F. Cary of Ohio was substituted. The platform, besides the three points above, demanded the repeal of the Resumption Act. The ticket polled 81,737 votes, over half of them in Michigan, Illinois, Indiana, Iowa, and Kansas. In the State elections the next year the party polled 187,095 votes, but the main strength continued to be in the West. The next year it was absorbed in the Greenback-Labor Party (q.v.).

Greenbacks (as printed in green ink), the current name, from the first, of the legal-tender notes first issued by the government during the Civil War. (See DEBT, NATIONAL.) The authorizing act was signed by Lincoln 25 Feb. 1862; it was the first ever passed by Congress making anything but coin legal tender, and nearly all the Democrats and many Republicans declared it unconstitutional. But war necessities were too exigent, and the bill authorized \$150,000,000 of the notes, not receivable for import dues nor payable by the government as interest on its obligations. On 11 June 1862 and 3 March 1863 further issues were authorized; and on 3 Jan. 1864 they reached their maximum amount of \$449,338,902. The great inflation, the uncertain fortunes of the War, and the belief that even if victorious the United States neither could nor would pay its enormous debt at face value, but would repudiate or scale it, combined to depreciate the value of the notes; throughout 1864 they were worth on an average only about 45 cents on the dollar, and on one day, 11 July, when Early was threatening Washington, they dropped in panic to about 35 cents — or as currently expressed, the "premium on gold" was 285. The legal-tender acts had always been understood to be temporary war measures only, and a choice of evils; the secretary of the treasury (McCulloch) in his report for 1865, expressed the opinion that they ought not to be in force a day longer than was necessary to prepare for a return to the gold standard. The House passed a resolution of cordial concurrence, 144 to 6; and on 12 March 1866 both houses agreed on a reducing act, by which on 31 Dec. 1867 the volume of greenbacks stood at \$356,000,000. But the demoralization of economic sentiment and

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judgment wrought by them, which afterward issued in the Greenback party, was already at work; many attributed the prosperity of the time to the currency inflation, and even in Congress a majority had determined to make the paper currency a permanent feature of our finance. On 4 Feb. 1868 any further reduction was prohibited, and the volume stood at this mark till October 1872, when it began to increase, amounting on 15 Jan. 1874 to \$372,979,815. On 20 June 1874 the maximum was fixed at \$382,000,000. Meantime a test case had been made up to try the question of their constitutionality (*Hepburn v. Griswold*: see *LEGAL TENDER CASES*), and in 1869 the Supreme Court, by five to three, headed by Chief-Justice Chase, decided against them. The fiercest political opposition was roused by this, however, and it became a party question. The Supreme Court, in May 1871, reversed its decision by one majority. This experience has led the Supreme Court to be excessively cautious about taking jurisdiction in any case where strong political feeling is involved. The question of legal tender has become unimportant since the passage of the "Gold Standard Bill" (q.v.), under which no depreciation in value is possible.

Green'brier, any of various prickly vines of the genus *Smilar* (q.v.), commonly the catbrier (*S. rotundifolia*), which grows all over the eastern half of the United States and is especially numerous in the Southern Alleghanies, where it designates various mountain-ranges, streams, etc.

Greenbrier Mountains, a range of mountains in the eastern part of West Virginia, lying west of the main part of the Alleghanies and parallel to the Greenbrier River (q.v.). Their average height is about 2,000 feet, the highest point being about 3,500 feet.

Greenbrier River, a river of West Virginia, rising in the Rich Mountains, Randolph County, flowing southwest into New River; length 150 miles.

Greenbrier White Sulphur Springs, W. Va., the name sometimes given the White Sulphur Springs in the Greenbrier Mountains to distinguish them from less important springs of similar character. See *WHITE SULPHUR SPRINGS*, W. Va.

Green'bush, N. Y., formerly a town now a part of the city of Rensselaer in Rensselaer County on the Hudson River and the Boston & A. and the New York C. & H. R. Railroads. See *RENSSELAER*.

Green'castle, Ind., city and county-seat of Putnam County, on the Cleveland, C., C. & St. L., the Louisville, N., A. & C. and the Vandalia Line R.R.'s; 35 miles northeast of Terre Haute. It is the seat of De Pauw University, with her 9 large buildings. She has excellent public schools and a fine library building containing 7,000 volumes. It was settled in 1822 and incorporated in 1849. The form of government is by a mayor and a municipal council elected every two years. Greencastle contains lumber-mills and manufactories of lightning rods, pumps, and one of the largest and best equipped tin-plate factories in the world. Pop. (1910) 3,790.

Greene, Aella, American journalist and poet: b. Chester, Mass., 1838; d. Springfield,

Mass., 1903. He was the author of: 'Rhymes of Yankee-Land'; 'Into the Sunshine' (1881); 'Stanza and Sequel' (1884); 'Gathered from Life.'

Greene, Albert Gorton, American lawyer and poet: b. Providence, R. I., 10 Feb. 1802; d. Cleveland, Ohio, 4 Jan. 1868. Graduated from Brown University 1820, he was admitted to the bar in 1823; in 1832 became clerk of the town and of the municipal court of Providence, and in 1858 judge of the court. From 1867 he was in Cleveland, Ohio. He was at one time president of the Rhode Island Historical Society, was a founder of the Providence Athenæum, began the Harris collection of American verse (now at Brown University), and wrote some well-known poems, such as 'Old Grimes' and 'The Baron's Last Banquet.'

Greene, Charles Ezra, American engineer: b. Cambridge, Mass., 12 Feb. 1842; d. Ann Arbor, Mich., 17 Oct. 1903. Graduated from Harvard in 1862 and from the Massachusetts Institute of Technology in 1868, he was United States assistant engineer in 1870-1, city engineer of Bangor, Maine, in 1871-2, and in 1872 became professor of civil engineering in the University of Michigan. He also practised as consulting engineer, and in 1876-7 was associate-editor of the 'Engineering News.' His writings include: 'Graphical Method of Analysis of Bridge Trusses' (1875), 'Structural Mechanics' (1897), and other technical works.

Greene, Christopher, American soldier: b. Warwick, R. I., 1737; d. Westchester County, N. Y., 13 May 1781. He was among the first to take the field on the American side after the engagements at Lexington and Concord. Subsequently, as colonel of a Rhode Island regiment, he participated in the campaign in Canada under Arnold. In 1777, while in command at Fort Mercer at Red Bank, on the Delaware, he sustained an attack from a large force of Hessians under Col. Donop, who were repulsed with great slaughter. For these services a sword was voted him by Congress, and a monument commemorative of the battle and of the valor of the American commander was erected in the neighborhood of Fort Mercer in 1829.

Greene, Edward Lee, American botanist: b. Hopkinton, R. I., 20 Aug. 1843. After studying at Albion College, Wis., he took orders in the Protestant Episcopal Church (1871); but in 1885 entered the Church of Rome. He has been professor of botany at the Roman Catholic University in Washington since 1895, and has published 'Illustrations of West American Oaks' (1890); 'Flora Franciscana' (1891); and 'Pitonia' (1890).

Greene, Francis Vinton, American soldier: b. Providence, R. I., 27 June 1850. He was graduated at West Point with the rank of second lieutenant of artillery. In 1876 he was made military attaché at St. Petersburg and remained at the headquarters of the Russian army during the Russo-Turkish War (1877-8), in the course of which he was twice decorated for bravery. Obtaining his captaincy in 1883 he was three years later appointed instructor in military engineering at West Point, but left the service to join the Barber Asphalt Company, and was president of the National Asphalt Company when the trust went into the hands of receivers. He entered the National Guard in

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1889 on the staff of Gen. Louis Fitzgerald and was elected colonel of the Seventy-first regiment in 1892. In the Spanish-American War he was commissioned major-general of volunteers and served principally in the Philippines. In 1902 he was appointed police commissioner of New York. He has written: 'The Russian Army and its Campaign in Turkey' (1879); 'Army Life in Russia' (1880); 'The Mississippi' (1882); 'Life of General Nathanael Greene' (1893).

Greene, George Sears, American civil engineer and soldier: b. Warwick, R. I., 6 May 1801; d. Morristown, N. J., 28 Jan. 1899. He was graduated at West Point in 1823 and was for several years one of the professors there, but in 1836 adopted civil engineering as a profession, after sending in his resignation as an officer in the United States army. He was engaged subsequently in railway construction in many eastern States, and in 1856 the Croton Aqueduct Department of New York city commissioned him to execute several important works. He designed and constructed the reservoir in Central Park, widened High Bridge, and built a water tower and reservoir at its western extremity. At the beginning of the Civil War he took command of the Sixtieth New York Volunteers, and was put in command of a brigade at Cedar Mountain and a division at Antietam. He took part in many other important events of the war and was severely wounded in an engagement near Chattanooga, in 1863. In 1866 he retired from the army and the following year was appointed commissioner and chief engineer of the Croton Aqueduct Department, and in 1871 was called to Washington, D. C., as chief engineer of public works. During his three years' incumbency of that office he planned the sewer system of the national capital.

Greene, George Washington, American historian: b. East Greenwich, R. I., 8 April 1811; d. there 2 Feb. 1883. He was a grandson of Gen. Nathanael Greene (q.v.) of Revolutionary fame. After study in Brown University, he traveled extensively in Europe, was United States consul at Rome in 1839-45, and from 1848 until his resignation in 1852 was professor of modern languages at Brown University. He was appointed non-resident professor of history at Cornell in 1872. His publications include several historical works, such as: 'Historical View of the American Revolution' (1865), 'Life of Nathanael Greene' (1867-71), 'The German Element in the War of American Independence' (1876), and a 'Short History of Rhode Island' (1877).

Greene, Homer, American author and lawyer: b. Ariel, Pa., 10 Jan. 1853. He was graduated from Union College in 1876, from the Albany Law School in 1878, was admitted to the bar in 1879, and entered practice at Honesdale, Pa. In Pennsylvania politics he has been active as a Republican. He has contributed much verse and prose to the magazines, and published: 'The Blind Brother,' 'Burnham Breaker,' 'Coal and the Coal Mines,' and 'The Riverpark Rebellion.'

Greene, Nathanael, American soldier: b. Patawomut, Warwick County, R. I., 7 Aug. 1742; d. Mulberry Grove, Ga., 19 June 1786. His father, a leading preacher among the Quakers, was the owner of an anchor forge and

a grist mill. He was brought up as a Quaker, and trained from childhood to work on the farm and at the forge. Resolute perseverance in the midst of many obstacles gave him in the course of time a more than ordinary familiarity with ancient and English history, geometry, law, and moral and political science. In 1770 he was chosen a member of the general assembly for Coventry, whither he had removed to take charge of another forge; and from that time continued to take an active part in public affairs. He was one of the first to engage in the military exercises which prepared the way for resistance to the encroachments of the mother country, and this open renunciation of the principles of his sect was promptly followed by formal excommunication. In 1774 he joined the Kentish guards as a private; in July of the same year was married to Catharine Littlefield of Block Island, and in 1775 was appointed by the general assembly to command as brigadier-general the Rhode Island contingent to the army before Boston. He joined his command at Roxbury on 3 June and from that time remained in active service without a day's furlough till the final disbandment of the army in 1783. At Boston his brigade was distinguished by its discipline, and after the evacuation he was entrusted with the defense of Long Island. He distinguished himself in the battle of Harlem Heights, later commanded a portion of Washington's army near Ft. Washington on the Hudson, and in September he was made major-general, and appointed to the command in New Jersey. At Trenton he led the division with which Washington marched in person, and, with Knox, was for following up the advantages of that brilliant surprise by advancing directly upon the other detachments of the enemy. He took an equal part in the battle of Princeton, and was entrusted by Washington during the winter with a confidential communication to Congress. At the Brandywine he commanded a division, and by a rapid march and successful stand preserved the army from utter destruction. At Germantown he commanded the left wing which penetrated into the village. On 2 March 1778, he accepted the office of quartermaster-general, which he held till August 1780, fulfilling its arduous and complicated duties in such a manner as to call forth from Washington when he left it the declaration "that the States have had in you, in my opinion, an able, upright, and diligent servant." On 23 June 1780, he checked with two brigades and a small body of militia the advance of a corps of 5,000 of the enemy in the brilliant battle of Springfield. He was in command of the army during Washington's visit to Hartford in September 1780, when Arnold's conspiracy was discovered, and sat as president of the court of inquiry upon Major André. In October of the same year, he was appointed to the command of the Southern army, which he found on his arrival, in December, in a state of utter disorganization and want. He soon advanced to a well-chosen camp on the banks of the Pedee, and began a series of operations which in less than a year stripped the enemy of nearly all their hard-won conquests in the two Carolinas and Georgia, and shut them up within the narrow limits of Charleston and its immediate neighborhood. Among the events of this active year were the battle of the Cowpens, won by Gen. Morgan at the opening of the campaign; a brilliant retreat from the Catawba.

to the Dan; the battle of Guilford Court House in which he lost the field, but gained the end for which he fought; the pursuit of Cornwallis to the Deep River; the daring advance into South Carolina; the battle of Hobkirk's Hill, a second defeat followed by the results of victory; the siege of Fort Ninety-six, raised by the advance of Lord Rawdon, but followed by the immediate evacuation of the post and the retreat of the enemy toward the west; the drawn battle of Eutaw Springs, and the advance upon Dorchester, spoken of by Washington as another "proof of the peculiar abilities" of Gen. Greene. Congress presented him with a medal for services in the battle of Eutaw Springs, and North and South Carolina and Georgia made him valuable grants of property. He removed to the estate of Mulberry Grove, on the Savannah River, Georgia, where he died of a sunstroke. Consult G. W. Greene, 'Life' (1867-71); F. V. Greene, 'General Nathanael Greene' (1893).

Greene, Nathaniel, American journalist: b. Boscawen, N. H., 20 May 1797; d. Boston, Mass., 29 Nov. 1877. At 12 he entered the office of the *New Hampshire Patriot*, published at Concord, and at 15 became editor of the *Concord Gazette*. After editing papers at Portsmouth, N. H., and Haverhill, Mass., he removed to Boston, where he established a new Democratic paper known as the *Boston Statesman*, and published semi-weekly, its first appearance being on 6 Feb. 1821. During the administration of J. Q. Adams it was opposed to the almost unanimous sentiment of the city and State; but in 1829, when the general government passed into the hands of the Democratic party, President Jackson appointed Greene postmaster of Boston. He held the office for 12 years without interruption, and, although removed in 1841, was reappointed to it by President Tyler in 1844, and held it until 1849. In 1836 he translated a 'History of Italy' from the Italian of Sforzozzi, which was followed by the translation of two volumes of 'Tales from the German' (1837). In 1843 he published 'Tales and Sketches from the French, German, and Italian.'

Greene, Robert, English writer: b. Norwich, 1558?; d. London, 3 Sept. 1592. Though little is known of his early life, Robert Greene was probably born in 1558; his father may have been a saddler. The greater part of his career is conjectured from his more or less autobiographical novels and pamphlets. He entered Saint John's College, Cambridge, in 1575, and took his B.A. in 1578. Already in his college years, perhaps earlier, he had entered heartily into the dissipation for which he was notorious, though perhaps his own record of himself and that left by his enemy Gabriel Harvey, may both be exaggerated. Upon leaving college he seems to have traveled extensively abroad, learning, from his own account, far more evil than good. Shortly after his return to England he heard a sermon in Saint Andrew's Church, Norwich, which strongly moved him to repentance, but he soon recovered his usual recklessness. The incident, however true, is characteristic of him; his excesses alternated with highly emotional confessions of penitence, which were probably

quite sincere. The original fineness of his spirit was little harmed by his wild courses; his writing throughout is remarkably pure-minded. In 1580 'Mamilia,' his first novel, was registered; it was published three years later. It seems that he was then studying medicine at Cambridge, where he took his M.A. in 1583. Within two years afterward he married a woman of good family. After their one child was born, Greene deserted her, and gave himself up to a wild life in London. It has been pointed out that the character of the patient, deserted wife recurs through his writings, as though the woman he had wronged was always in his mind.

Greene's first occupation in London was the writing of prose romances, varying between the type of Sidney's 'Arcadia' and Lyly's 'Euphues.' His success in this kind of writing was immediate. He had a better narrative faculty than either Sidney or Lyly, and in addition to an unusual facility in composition he had something of the journalist's skill in finding the interest of the moment. Before 1590 he had written 'Penelope's Web,' 'Euphues, his Censure to Philautus,' 'Alcida,' 'Greene's Metamorphosis,' 'Perimedes the Blacksmith,' 'Orpharion,' 'Pandosto,' 'The Spanish Masquerado,' 'Menaphon,' and 'Tullies Love.' He had also made many good friends. Nash he had known before; now he met Lodge and probably Marlowe. But at the same time he was living a strangely profligate life, among thieves and outcasts, his special comrade being their chief, Ball, who ended his career at Tyburn. Ball's sister was Greene's mistress, the mother of his son Fortunatus.

In 1590 appeared 'The Cobbler of Canterbury,' a collection of six coarse tales, ascribed to Greene. Greene repudiated the book in a pamphlet, 'Greene's Apology,' announcing his intention to write no more such romances as might make him seem the likely author of 'The Cobbler.' As further expressions of this characteristic repentant mood appeared in the same year his 'Mourning Garment' and 'Never Too Late,' and in 1591 'Farewell to Follie.' Within the next year he wrote his five pamphlets on 'cosenage' or 'coney-catching'—descriptions of the lives and methods of thieves and cutpurses; for his material he drew on his own experience and observation, and the pamphlets present pictures of astonishing realism. His old companions whom he had now turned on, are said to have tried to kill him.

In a satire on the social evils of the times, 'A Quip for an Upstart Courtier' (1592), Greene took occasion to insult Gabriel Harvey and his two brothers, one of whom, Richard, in a pamphlet on the Martin Marprelate Controversy had spoken harshly of Greene and his friends. The wrath of the Harveys was turned upon Greene, and pursued him even after his death, in Gabriel Harvey's 'Four Letters and Certain Sonnets especially touching Robert Greene'—a cruel account of Greene and of his last hours.

The first play of Greene's, according to the most recent scholarship, was 'Alphonsus,' about 1591, an imitation of Marlowe's 'Tamburlaine'; the second was probably the 'Looking Glass for London and England,' in which some of the material of the 'coney-catching' pamphlets is

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reflected. Before 1592 he had written the 'Orlando Furioso,' 'Friar Bacon and Friar Bungay,' and 'James IV. of Scotland,' probably in that order.

At the end of the year 1592 Greene fell ill, and with death at hand, his better nature reasserted itself. On his deathbed he wrote or completed his 'Groatworth of Wit Bought with a Million of Repentance,' and 'The Repentance of Robert Greene,' which were published shortly after his death. His affecting letter to his wife, whom he now remembered; the pathetic squalor of his death scene in the shoemaker's house; his ironical request to be crowned with bays—complete one of the romances of literary biography.

Greene is an important figure in the history of the English novel, drama, and lyric. His amorous romances are in the Euphuistic style, and their subject-matter is Arcadian; but Greene's vital interest in life at first hand and his humor tend to humanize the artificial manner, and to bring the content of the stories out of the pastoral glamour into a natural world. The pastoral habit of beauty is perilously near shipwreck in the passage in 'Menaphon' where the shepherd and his jealous mistress, Pesana, begin to quarrel with true rustic energy and frankness; and the same genius for realism found its opportunity in the later 'coney-catching' pamphlets, which, though formless, practically have the interest of the picaresque tale. The delicacy of his feminine characters, however, proves Greene's sympathy with the courtly world of beauty that his realistic power helped to supplant.

Greene's dramatic work, with the exception of 'Friar Bacon and Friar Bungay' and 'James IV. of Scotland,' is unimportant, but in the first of these better known plays he is clearly a forerunner of Shakespeare; as in the romances, he represents a transition, from the serious drama, religious or heroic, to a realistic mingling of moods and themes; and his country folk belong to England, not to Arcadia.

His real fame rests on the lyrics in the romances. These songs, like those in the 'Arcadia,' all highly wrought, are quite without Sidney's pedantry; they are at times stately, as in 'Doron's Description of Samela,' or pathetic, as in 'Sephestia's song to her child,' or metrically ingenious, as in Menaphon's song, 'Some say love'; but they all have a certain silvery music, a tone of dignity without heaviness, which in its peculiar quality is found only in Greene. Lodge's lyrics are the only examples that can be compared with his. In 'Rosalind' the famous 'Love in my bosom like a bee' is perhaps smoother than anything in Greene; and 'Rosalind's Description' is the best example of Lodge's rich, pictorial coloring. But Lodge's art, though finer, is less directly human than Greene, whose lyrics, like the account of his career, stir one with a sense of the actual man.

Bibliography.—The best complete edition is that by Grosart, 'The Huth Library'; the best edition of the plays and poems is that by Churton Collins. For biography and criticism, consult 'Introductions' to above.

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Greene, Samuel Dana, American naval commander: b. Cumberland, Md., 11 Feb. 1840; d. Portsmouth, N. H., 11 Dec. 1884. Graduated at the Naval Academy in 1859, he volunteered in January, 1862, to serve as executive officer of the Monitor, whose capabilities were then untested, and during the engagement of the Monitor with the Confederate ram Merrimac, in Hampton Roads, he commanded the vessel on account of an accident to Captain Worden, his superior. After the war he was a professor at the Naval Academy for 10 years.

Greene, Sarah Pratt McLean, American novelist: b. Simsbury, Conn., July 1856. She was educated at South Hadley Seminary and for several years taught school in Plymouth, Mass. In 1887 she was married to F. L. Greene. She has published 'Cape Cod Folks'; 'Towhead, the Story of a Girl' (1884); 'Lastchance Junction' (1889); 'Leon Pontifex' (1897); 'The Moral Imbeciles' (1898); 'Vesty of the Basins' (1900); 'Flood Tide' (1901); 'Winslow Plain' (1902); etc.

Greenfield, Ind., city, county-seat of Hancock County, on the Pittsburg, C. & St. L. R.R., 20 miles east of Indianapolis. It has foundries, machine shops, and manufactures of glass, paper, stoves, etc. It is the birthplace of James Whitcomb Riley (q.v.). Pop. (1910) 4,448.

Greenfield, Mass., town, county-seat of Franklin County; on the Connecticut River, the Boston & M. R.R.; about 34 miles north of Springfield. Greenfield was once a part of Deerfield; but in 1738 it petitioned for a separation which was not granted until 1743. Greenfield and vicinity has many famous historic associations. The massacre of Deerfield occurred in the winter of 1704, and a monument marks the place where an Indian struck down Eunice Williams, the wife of the parson, John Williams, on 1 March, 1704. The chief manufactures are machinery, cutlery, shoes, paper, boxes, wooden-ware, bricks, toys, children's carriages. Pop. (1910) 10,427.

Greenfinch, or **Greenlinnet**, one of the most common and beautiful of European finches (*Ligurinus chloris*). The general color of the male is olive-green; primaries grayish-black, with bright yellow edges; under parts yellow; female brownish. Although its song is uninteresting it is a favorite cage-bird in Germany. In Texas a greenish towhee bunting (q.v.) is locally called 'greenfinch.'

Greenhouse, any glass-roofed house used for plant growing. The term excludes cold frames and hot-beds, but in America includes many structures known in Europe by special names, such as stove-houses, graperies, conservatories, etc. Greenhouses may be divided according to the temperature maintained in them; for example, cool-house, used for such plants as violets, pansies, daisies, etc.; conservatory, used for plants displayed but not propagated or forwarded in growth; the forcing house in which plants are rapidly pushed

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to marketable condition; the warm-house, used for tropical and heat-loving plants. Then there are houses designed for special crops and known as rose-, carnation-, palm-, orchid-, asparagus-houses, etc.

Since the beginning of the 19th century, and especially during the latter half, improvements in greenhouse construction, heating, ventilation, and management have made remarkable progress. In place of the heavy shade-casting roof of large wooden rafters and small panes is the large-paned, small iron-raftered roof; steam and hot water have supplanted the old flue systems; and the carefully pitched roof which favors the entrance of light in winter and not in summer, has replaced the roof of scarcely considered slant. Much attention is also given to location, some points considered being exposure to the sun, shelter from prevailing winter winds, adequate water supply, proximity to market, etc.

An idea of the importance of greenhouses may be gained from the knowledge that during the first quarter of the 19th century there were almost no greenhouses except the few cumbersome ones upon some private places, and that in 1899 there were about 9,000 commercial florists' establishments averaging about 2,500 square feet, valued at 50 cents a square foot, and a producing capacity of \$1.00 a square foot—totals of \$11,250,000 and \$22,500,000, respectively. Besides these are hundreds of private establishments, many of which would have been considered very extensive as commercial houses 75 or even 50 years ago.

Consult: Taft, 'Greenhouse Construction' (New York 1893); Leuchars, 'Hot-Houses' (1850); Hunt, 'How to Grow Cut Flowers' (Terre Haute, Ind., 1893); Taft, 'Greenhouse Management' (New York 1898); Scott, 'Florists' Manual' (Chicago 1899); Bailey, 'Forcing Book' (New York 1897); *id.*, 'Cyclopedia of American Horticulture' (New York 1900-02).

Greenhouse Insects. Plants cultivated under glass are as subject to insect depredations as are those growing in the garden and orchard, unless the greatest care is exercised. In addition to many species of foreign origin, such as numerous kinds of scale-insects (q.v.) and aphides which are constantly being imported with exotic plants, we have native insects firmly established as indoor pests. One of the commonest and most destructive is the black scale (*Lecanium oleæ*), which is also a pest of importance in groves of citrus fruits and olives. The related hemispherical scale (*Lecanium hemisphaericum*) is still more distinctively a greenhouse pest; and several injurious orchard scales and mealy bugs (q.v.) are likely at any time to become so, but all may be controlled by fumigation with hydrocyanic-acid gas. The "white fly" (q.v.), which name, as used by florists, covers a number of species of *Aleyrodes*, is to be similarly treated.

Many plants grown artificially are attacked also by omnivorous greenhouse pests, such as the red spider (*Tetranychus bimaculatus*) and the greenhouse leaf-tyer, and by general field and garden pests such as cutworms, wireworms, and white grubs (qq.v.). The greenhouse leaf-tyer (*Phlyctania ferrugalis*) is less affected by fumigation than most insects, and, with other caterpillars, can be successfully controlled only by hand-picking, clipping off and destroying the

affected leaves, and by spraying with arsenical mixtures.

Roses are peculiarly subject to insect injury, and there are several specific indoor rose pests, such as Fuller's rose beetle (*Aramigus fulleri*), which also attacks azaleas, begonias, lilies, primrose, geranium, canna, and others. It appears to be nearly immune to insecticides in the adult condition; one must, therefore, employ hand methods, collecting and destroying the beetles, preferably in November and December, when they congregate on various plants. Injured plants should be pulled out, and the larvæ about them destroyed with kerosene emulsion or bisulphid of carbon. Numerous leaf-rollers, budworms, and leaf-tyers (qq.v.) are very injurious to the rose, by eating into the buds just before blossoming. Roses are seriously injured at times by gall-flies and by the rose-scale (*Aulacaspis rosæ*), and other scale insects. Violets cultivated under glass are much injured by insect pests, principally by the black or brown aphid (*Rhopalosiphum violæ*), violet gall-fly (*Diplosis violicola*), violet saw-fly (*Emphytus canadensis*), and the red spider, and greenhouse leaf-tyer. The black aphid is still restricted and dependent on commerce for carriage from one greenhouse to another, but has caused losses of thousands of dollars to single firms. It may be controlled by fumigation with hydrocyanic-acid gas, which also destroys the saw-fly and the gall-fly (properly a gall-gnat, q.v.), which attacks the leaves while they are young, the larva or maggot developing in folds, incorrectly termed "galls." Tobacco preparations and hubach insect-powder are also useful against these minute pests.

Greenland, an extensive island belonging to Denmark; on the northeast of the continent of North America, from which it is separated by Davis Strait, Baffin Bay, and Smith Sound; area 46,740 square miles. A great part of its north and precipitous east coast is yet unknown; but it does not extend farther than about lat. 83° N. Like the northern parts of North America generally, Greenland is colder than the corresponding latitudes on the eastern side of the Atlantic. In June and July the sun is constantly above the horizon, the ice on the coast is broken up and a few small lakes are opened; but the short summer is followed by a long and dreary winter. The interior, which is lofty, is uninhabitable, and all the villages are confined to the coasts, which are lined with numerous islands and deeply penetrated by fiords. The Danish colony extends to the Bay of Disco, in lat. 69° N. Cultivation is confined to the low shores and valleys, where grassy meadows sometimes occur with stunted shrubs and dwarfed birch, alder, and pine trees. Attempts to raise oats and barley have failed, but potatoes and turnips attain the size of a pigeon's egg, and cabbages grow very small. The radish is the only vegetable which grows unchecked.

The inhabitants of Greenland (see **ESKIMOS**) are of the Eskimo race, more or less mixed with European blood. The individuals of the mixed race hardly differ as to language and habits from the genuine Eskimo. Besides the natives, about 250 Europeans usually reside in the country, 30 to 40 of whom have married native women. The inhabitants are largely dependent on hunting and fishing. Whale blubber and seal oil

GREENHOUSE FLOWERING PLANTS



1. Blue Passion-flower (*P. cœrulea*). 2. Pomegranate, with opened fruit and flower. 3. An Orchid (*Cattleya*). 4. Abutilon (*A. insignel*). 5. Monkshood (*Tropæum*). 6. Anthurium (*A. scherzerianum*). 7. Begonia (*B. bolivensis*). 8. Pitcairnia (*P. furfuracea*). 9. Ladies' Slipper (*Cypripedium venustum*).

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GREENLAND WHALE—GREENOUGH

are used as fuel. The land animals are the Eskimo dog, the reindeer, the polar bear, the Arctic fox (blue and white), the ermine, the Arctic hare, and the musk ox. Among the amphibious the walrus and several species of seal are common. The seas abound in fish, the whale and cod fisheries being of special importance. Seafowl are abundant in summer, and largely killed. The chief mineral product is cryolite, but graphite and miocene lignitic coal are also found. Oil, eider down, furs, and cryolite are exported. For administrative purposes Greenland, or rather its coast, is divided into two inspectorates of North and South Greenland. The residences of the inspectors are at Disco Island and Godhaab, but the most populous district is Julianehaab.

Greenland was discovered by an Icelander named Gunnbjörn about 876 or 877, and was colonized from Iceland about the end of the 10th century. In the reign of Elizabeth Frobisher and Davis rediscovered the coast, but nothing was done to explore it till the Danish government in 1721 assisted Hans Egede, a clergyman, to establish a European mission settlement, Good Hope (Godhaab), which was successfully carried on by him and his son. Whale fisheries were established on the coast by the English and Dutch about 100. The interior of the country was first crossed by Nansen in 1888. There are 12 chief stations for trading and the Danish Mission; the southernmost is Julianthaa, the northernmost Upernavik. At Godhaab there is a seminary for training native catechists; of late, too, natives have been appointed pastors.

Greenland Whale, or **Bowhead**, the largest and most restricted of the "right" or whalebone whales of the genus *Balæna* (*B. mysticetus*), which is absolutely confined to the arctic region, reports of its occurrence on other coasts originating in mistaking for it the almost cosmopolitan southern right whale. It grows occasionally to a length of 70 feet, but is usually considerably less; and is black, except a white patch on the under side of the jaw. This whale may yield 275 barrels of oil, and 3,000 pounds of whalebone. It has become comparatively rare through constant pursuit. Its general habits agree with those of its family (*Balænidæ*), for which see **WHALEBONE WHALES**.

Greenleaf, Simon, American jurist: b. Newburyport, Mass., 5 Dec. 1783; d. Cambridge, Mass., 6 Oct. 1853. He commenced the practice of law in 1806 at Standish, afterward practising at Gray and Portland. He was a reporter of the Supreme Court 1820-32; professor of law at Harvard University 1833-48, succeeding Judge Story in the Dean professorship in 1846; and upon his resignation in 1848 was made professor emeritus. Beside nine volumes of reports of the Maine Supreme Court proceedings he published: 'Treatise on the Law of Evidence' (1842-53); 'Principles of Freemasonry' (1820); 'Examination of the Testimony of the Four Evangelists by the Rules of Evidence, as administered in Courts of Justice, with an Account of the Trial of Jesus' (1846). He also edited Cruise's 'Digest of the Laws of England respecting Real Property' (1849).

Greenlings, a family (*Hexagrammidæ*) of coast-fishes allied to the rose-fishes, many species of which occur abundantly from northern

California to Bering Sea, including several excellent and of local importance as food-fishes. They are brilliant in color, yellow and green being prominent; are carnivorous; and seek their food among kelp and about rocks.

Greenock, grèn'ók, Scotland, in Renfrewshire, on the south shore of the Firth of Clyde, 22½ miles by rail west-northwest of Glasgow. The Watt Institution contains a marble statue of Watt by Chantrey. The harbor works date from 1707, and have cost upward of \$7,500,000. Ship-building has been carried on since 1760; sugar refining began in 1765, and there are also manufactures of steam-engines, anchors and chain cables, ropes, sailcloth, paper, wool and worsted, etc. Besides being the birthplace of James Watt (q.v.), famous because of his work on steam-engines, of Spence the mathematician, and of Principal Caird, it has memories of Rob Roy, John Wilson, and Galt, and contains the grave of Burns' "Highland Mary." Pop. about 70,000.

Greenockite, or **Cadmium Blende**, a native sulphid of cadmium, having the formula CdS, and crystallizing in hemimorphic forms belonging to the hexagonal system. It is transparent, or nearly so, and yellow, with a vitreous or resinous lustre. It turns carmine when heated in a closed tube, returning to its original color upon cooling; and it dissolves in hydrochloric acid, with liberation of sulphuretted hydrogen. Greenockite is brittle, and has a hardness of from 3 to 3.5, and a specific gravity of about 5.0. In the United States it is found in Marion County, Ark., in the zinc-bearing districts of southwestern Missouri, and in a zinc mine in Lehigh County, Pa.

Greenough, grèn'ô, **Horatio**, American sculptor: b. Boston 6 Sept. 1805; d. Somerville, Mass., 18 Dec. 1852. When he entered Harvard at 16 he had already modeled in clay and attempted sculpture. A French sculptor named Binon, resident in Boston, was his first master. During his college career he enjoyed the friendship and advice of Washington Allston, and produced the design from which the present Bunker Hill monument was erected. He was graduated in 1825, and went to Rome with letters to Thorwaldsen. He returned to Boston in 1826, and after modeling busts of John Quincy Adams, Chief Justice Marshall, and others, again went to Italy and established his studio in Florence. His first commission was from James Fenimore Cooper, for whom he executed his 'Chanting Cherubs,' suggested by a portion of one of Raphael's pictures. This was the first original group from the chisel of an American sculptor. To Cooper, also, he was indebted for the commission from Congress to execute his colossal statue of Washington, finished in 1843, after many years' labor, and now in the national capital. During this time he executed, among other original works, the 'Medora,' the 'Angel Abdiel,' and the 'Venus Victrix' (Gallery of the Boston Athenæum). In 1851 he returned to the United States to superintend placing in its destination in Washington his group of the 'Rescue,' in which the triumph of civilization is symbolized. Many vexatious delays prevented the arrival of the work from Italy, and Greenough, unaccustomed by long absence to the turmoil of American life, and the variations of the American climate,

GREENOUGH — GREENSAND

was attacked by brain fever, soon after he had commenced, in Boston, a course of lectures on art. He published a volume of 'Essays' on art topics. Consult: Tuckerman, 'Memorial of Horatio Greenough' (1853).

Greenough, James Bradstreet, American Latin scholar: b. Portland, Me., 1833; d. Cambridge, Mass., 11 Oct. 1901. He was graduated from Harvard College in 1856, for some time practised law in Michigan, in 1865 was appointed tutor in Latin at Harvard, in 1874 assistant professor of Latin, and in 1883 professor. In 1872 he began at Harvard a course in Sanskrit and comparative philology, and until 1880, when a chair of Sanskrit was founded, gave instruction in those subjects. He became widely known through a series of Latin text-books, particularly a 'Latin Grammar,' prepared in collaboration with J. H. Allen; and wrote also a 'Special Vocabulary to Virgil' verse in both Latin and English, and, with G. L. Kittredge, 'Words and Their Ways in English Speech' (1901).

Greenough, Richard Saltonstall, American sculptor: b. Jamaica Plain, Mass., 27 April 1819; d. Rome, Italy, 23 April 1904. Among works by him are the notably fine bronze statue of Franklin in front of the City Hall, Boston; the marble statue of Governor Winthrop at Mount Auburn cemetery, Cambridge; 'The Shepherd Boy and the Eagle' at the Boston Athenæum.

Greenough, Sarah Dana Loring, American author: b. Boston 19 Feb. 1827; d. Franzensbad, Austria, 9 Aug. 1885. She was the wife of R. S. Greenough (q.v.). Her works include: 'Treason at Home,' a novel (1865); 'Arabesques' (1871); 'In Extremis, a Story of a Broken Law' (1872); and 'Mary Magdalen,' a poem (1880).

Greenport, N. Y., village of Suffolk County, on the eastern end of Long Island, on the Long Island R.R.; 90 miles east of Brooklyn. It has an excellent harbor and shipyards, and the chief industries are fishing and ship-building. It is also a popular summer resort. Pop. (1910) 3,089.

Greens, Pot-herbs. Any plant whose foliage and succulent stems are prepared for the table by boiling. The former term is less applied to the plants themselves than to the dish prepared from them; the latter is often applied to the living plants, but rarely to the culinary preparation. Greens are eminently a spring dish; by proper management they may be obtained long before spring-sown vegetables grow from seed planted out of doors, thus arriving at a time when the appetite is jaded with the usual winter vegetables. Comparatively few (for example, basella and New Zealand spinach) are useful during the hot summer months, but then other vegetables and many fruits take their place. Some (for example, mustard, witloof) are obtainable in the autumn, and a few (kale, endive) even during winter.

In general these plants should all be grown upon rich, moist, well-drained, friable, loamy soil, since upon such they grow quickly, to a large size, and remain succulent and edible longer than upon poorer or drier soils. A soil containing abundant available nitrogenous plant food is particularly desirable. The ground should be thoroughly prepared by deep plowing

or digging and the surface made as fine as possible by harrowing or raking. For earliest crops of such hardy plants as spinach and corn salad, the seed may be sown in autumn, and, where the winters are severe, and especially if snowless, protected with a mulch of marsh hay or other material free from weed seeds. They may also be sown as early in the spring as the ground can be worked. Tender plants such as basella, and those that require a high temperature for the germination of their seeds, for instance, purslane, should be sown only after the ground becomes warm. Beyond keeping the surface of the soil loose and free from weeds, the crops need practically no further care. To be best appreciated, greens should be gathered while very succulent and within a few minutes of meal time as are possible to wash and cook them. Since most of them occupy the ground for only a few weeks in earliest spring, they are usually planted by market gardeners between the rows of other slower growing crops or as precursors to the main crop.

Besides the cultivated pot-herbs (in America a rather small list), there are several scores of plants known most widely as weeds. Several of these are superior in some ways to the cultivated kinds. There is no reason why they should not be cultivated; indeed, they deserve cultivation. When to be grown in the garden, and when seed cannot be purchased, seed should be selected from those plants that most nearly meet the intending grower's ideal. Probably the best known and most frequently used weeds or wild plants are the following, several of which are more or less cultivated: Lamb's quarters or Goosefoot (*Chenopodium album*), Pigweed (*Amarantus*, various species), Pokeweed (*Phytolacca decandra*), Marsh marigold, "Cowslip Greens" (*Caltha palustris*), Mustard (*Brassica*, various species), Dock (*Rumex*, various species), Quinoa (*Chenopodium Quinoa*), Sorrel (*Oxalis*, various species), Purslane (*Portulacca oleracea*), Plantain (*Plantago*, various species), Chicory (*Cichorium Intybus*), Cress (*Cardamine*, *Spilanthus*, *Barbarea*, *Senebiera*, *Gynandropsis*, *Nasturtium*—various species in each genus), Peppercress (*Lepidium*, various species), Mercury or markery (*Chenopodium Bonus-Henricus*), Nettle (*Urtica*, various species), Winter purslane (*Montia perfoliata*), Rocket salad (*Eruca sativa*), Salad-burnet (*Porterium Sanguisorba*).

Of the cultivated pot-herbs the following are probably the best known and the most widely cultivated: Spinach, corn salad, chard, borage, dandelion, callards, mustard, kale, orach, marigold, basella, chicory, endive, nasturtium, un-headed cabbage and cauliflower, young beets and turnips, whole or only the leaves, and rape are frequently used also.

Green'sand, in geology, the name given to two series of cretaceous formations, the Upper and Lower Greensand. The Upper Greensand is a subdivision of the Upper Cretaceous rocks, and is situated immediately below the chalk marl, and just above the gault. The beds of which it is composed have in them green particles of a mineral called glauconite. Among the fossils peculiar to it are various ammonites, two pterodontas, two species of fusus, etc. Some are of opinion that the so-called Upper Greensand from which these fossils came is

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itself gault. The Lower Greensand is a series of beds constituting the Lower Cretaceous rocks and the lowest member of the cretaceous group. It is called in Europe Neocomian, a name adopted by Lyell, he considering the term greensand peculiarly inapplicable, as in the district where these strata were first observed sand of a green color was rather the exception.

Greensboro, Ala., town, county-seat of Hale County; on a branch of the Southern R.R.; about 72 miles southwest of Birmingham. It was settled in 1816, and is in a cotton-growing section. The chief industries are the cultivation of cotton and corn. It is the seat of Greensboro Female Academy and of the Southern University. The latter was established by the Methodist Episcopal Church, South, and was opened in 1859. Pop. (1910) 2,048.

Greensboro, Ga., city, county-seat of Greene County; on the Georgia R.R.; 70 miles west of Augusta. It is the trade centre for a thriving agricultural region, and it has a large creamery, a cotton-mill, cotton-gin, and a cottonseed-oil mill. Pop. (1910) 2,120.

Greensboro, N. C., city, capital of Guilford County, on the Southern R.R.; 81 miles northwest of Raleigh; named in honor of Gen. Greene, who commanded the Continental army in the battle of Guilford Court House 15 March 1781. Here are the Greensboro Female College, Bennett School for Colored Youth, Guilford College, and the State Normal and Industrial College. Greensboro is the centre of a tobacco, fruit, and grain region, which has gold, copper, and iron mines, and contains a blast furnace for the manufacture of Bessemer steel; cotton-mills and other industries. The growth of the city has been marvelous and shows the rapid development of the New South. Pop. (1880) 2,105; (1890) 3,317; (1900) 10,035; (1910) 15,895.

Greensboro Female College, a non-sectarian educational institution for women in Greensboro, N. C.; founded in 1826 as the Edgeworth Female Seminary; reported at the close of 1900: Professors and instructors, 18; students, 225; volumes in the library, 7,000; income, \$25,000; number of graduates, about 750.

Greensburg, Ind., city, county-seat of Decatur County; on the Cleveland, C. C. and St. L. R.R.; about 55 miles northeast of Cincinnati. Nearby are large stone-quarries; it is surrounded by a good agricultural region, and is supplied with natural gas. Its chief manufactures are flour, furniture, farm implements, and carriages. Pop. (1910) 5,420.

Greensburg, Pa., borough, county-seat of Westmoreland County; on the Pennsylvania R.R.; 31 miles east-southeast of Pittsburgh. It is in a coal-mining, coking and natural gas region; and contains a steam-heating apparatus factory, steel works, glass works, nut and bolt works, and has three National banks. It is the seat of St. Joseph's Academy. In Hanna's Town, which was near the present Greensburg, was held (1773) the first regularly organized court of justice west of the Alleghany Mountains. Hanna's Town was destroyed by the Indians in 1782. Pop. (1910) 13,012.

Green'shank, a large species of sandpiper (*Totanus glottis*) breeding in the northern part

of the Old World, and migrating far southward. Several allied species of similar habits occur in America, of which the greater and lesser yellow-legs (q.v.) are familiar to gunners.

Green'slet, Ferris, American writer: b. Glens Falls, N. Y., 30 June 1875. He was educated at Wesleyan University and beside contributions to reviews has published 'Joseph Glanville: a Study in English Thought and Letters of the 17th Century' (1900).

Green'stick Fracture, the name given to a fracture of a bone when continuity is not entirely severed one portion of the bone remaining unbroken or bent. The leg and arm bones of children are particularly liable to this fracture.

Green'stone, formerly a granular rock, consisting of hornblende and imperfectly crystallized feldspar, the feldspar being more abundant than in basalt, and the grains or crystals of the two minerals more distinct from each other. It was called also dolorite. Sir Charles Lyell included under the term greenstone those rocks in which augite was substituted for hornblende, the "olorite" of some writers, and those in which albite replaced common feldspar. This was sometimes termed andesite. The term is now used the same as diorite, which is an essentially crystalline granular admixture of triclinic feldspar and hornblende. It is not now held to be the equivalent of dolorite. In geology, volcanic rock, occurring in dykes, tabular masses, etc.

Greenville, Ala., city, county-seat of Butler County; on the Louisville & N. R.R.; about 77 miles northeast of Mobile. Its chief manufactures are lumber and furniture; it has a cotton-gin, and its trade consists principally in cotton and lumber. Pop. (1910) 3,377.

Greenville, Ill., city, county-seat of Bond County; on the Vandalia & T. H., and the Louisville J. & St. L. R.R.'s; about 42 miles east of Alton. It is the seat of Greenville College, under the auspices of the Free Methodist Church. The chief manufactures are flour, lumber, wagons, and carriages, bricks, and in addition to its manufactured articles, it has considerable trade in coal, from the coal-fields of the vicinity, and in the agricultural products of the surrounding country. Pop. (1910) 3,178.

Greenville, Mich., city, in Montcalm County, on the Flat River, the Toledo, S. & M. and the Pere M. R.R.'s; about 42 miles northeast of Grand Rapids. Its chief manufactures are lumber, flour, agricultural and lumbering implements, refrigerators and furniture. Its trade is in its own manufactured products and in the agricultural products of the surrounding country. Pop. (1910) 4,045.

Greenville, Miss., city, county-seat of Washington County; on the Mississippi River, the Southern and the Yazoo & M. V. R.R.'s; about 139 miles south of Memphis. It contains several cottonseed-oil-, saw-, and planing-mills, a national bank, and has steamboat connection with all important ports on the river, and a large cotton trade. Pop. (1910) 9,610.

Greenville, Ohio, city, county-seat of Darke County; on Greenville Creek, and the Cincinnati, J. & M. the Dayton & U., and the Pittsburg, C., C. & St. L. R.R.'s; 35 miles north of Dayton. It is noted as the site of Anthony Wayne's treaty with the Indians, 3 Aug. 1795.

GREENVILLE—GREENWOOD

In the early part of the 19th century Tecumseh (q.v.) lived here, in a little Indian village. It has a foundry, lumber mills, and machine shops, and is the trade centre for a large agricultural section. Pop. (1910) 6,237.

Greenville, Pa., borough, in Mercer County; on the Shenango River, the Erie, the Pennsylvania, and the Pittsburgh, B. & L. E. R.R.'s; about 52 miles southeast of Erie. The Shenango furnishes an abundance of good water-power. The chief industrial interests are flour-mills, woolen-mills, saw- and planing-mills, foundries, machine-shops, railroad-shops, carriage and wagon works, tube-mills, machinery for oil-wells, and coal-mining. The coal and oil fields and the stone-quarries in the vicinity add to the industries of the town. The trade of the town is considerable, as it is the commercial centre of a large section of Mercer County and places nearby in Ohio. Greenville was formerly the seat of Thiel College, opened in 1870 under the auspices of the Lutheran Church. Pop. (1890) 3,674; (1900) 4,814; (1910) 5,909.

Greenville, S. C., city, county-seat of Greenville County; on the South Carolina & G., the Southern, the Atlantic C. L. R.R.'s; 153 miles northwest of Columbia. It is the seat of Furman University (Baptist), Greenville College for Women, Chicora Female College (Presbyterian), Greenville Female College (Baptist), a military institute, and a business college. It has cotton mills, carriage and wagon works, iron works, and flour mills. Pop. (1910) 15,741.

Greenville, Texas, city, county-seat of Hunt County; on the St. Louis Southwestern, the Texas Midland, and the Missouri, Kansas & Texas R.R.'s; about 235 miles north of Houston and 51 miles northeast of Dallas. Greenville was settled in 1844 and incorporated in 1875. It is situated in an agricultural and stock-raising section. The chief industrial interests are connected with cotton and live stock. It has cotton-compresses, cottonseed-oil mills, flour mills, machine-shops, stock-yards, and brick-yards. It is the trade centre for a large extent of country and has a large cotton trade. It is the seat of Burleson College, under the auspices of the Baptist Church, and of Holiness College. Greenville was one of the sixteen cities of Texas which, by 1911, had commission government. The electric-light plant is owned and operated by the city. Pop. (1890) 4,330; (1900) 6,860; (1910) 8,850.

Greenville (Ohio), Treaty of, 7 Aug. 1795. A treaty between the United States and all the Northwestern Indian tribes; the former represented by Anthony Wayne, who had defeated the Indians in the campaign of 1794, especially at the battle of the Fallen Timbers (q.v.). A full delegation was present from every hostile tribe, the whole numbering 1,130. They surrendered to the whites all southern Ohio and southeastern Indiana, with lands around Fort Wayne, Fort Defiance, Detroit, Michillimackinac, and the French towns, and 150,000 acres near the Falls of the Ohio (Louisville) which had been allotted to George Rogers Clark and his soldiers. The United States acknowledged the Indian title to the remaining territory, and agreed to pay annuities of \$9,500 in all to the tribes. All prisoners on both sides

were restored. This peace secured quiet to the borders for 15 years. But the guaranty of the lands to the Indians enabled the British to use the latter to desolate the borders in the War of 1812; and after the war (see **TREATY OF GHENT**) Great Britain attempted to make this treaty boundary a permanent one, forbidding United States settlement beyond it. See **GREENVILLE, O.**

Greenway, Thomas, Canadian statesman: b. England, 1838; d. 30 Oct. 1908. In 1844 he came with his father to Ontario. He took up land in Manitoba, and in 1887 became the Liberal leader and Prime Minister in the provincial government, when his party came into power in 1888. He studied the well-being and progress of his province; attempted to abolish French as an official language, and to do away with the separate school system.

Greenweed. See **DYEWEEED.**

Greenwich, grēn'wich, Conn., town, in Fairfield County, on Long Island Sound, the New York, N. H. & H. R.R., about 28 miles northeast of New York. The town was founded in 1640, as a part of the province of New York, and remained within the jurisdiction of the Dutch colony from 1642 to 1650, when, by agreement between the English and Dutch, it became a part of Connecticut. In order to preserve the charm of its country life, it has retained the old form of town meeting government, with three selectmen as agents, as it was over 250 years ago, except in the central part of the town, where a borough government, a warden and six burgesses, has charge of affairs. There are five residential centres within its area of 80 square miles; namely, Byram Shore, Belle Haven, Greenwich village, Riverside, and Sound Beach. It is the seat of Greenwich Academy, Brunswick School, and Rosemary Hall. Pop. (1910) 16,463. Consult: Mead, 'History of the Town of Greenwich.'

Greenwich, grēn'ij, England, metropolitan borough of London, in Kent, five miles from St. Paul's Cathedral and six miles southeast of London Bridge. It has many noted institutions, one of which is the Greenwich Royal Observatory, founded in 1675 by Charles II.; its first astronomer-royal was Flamsteed. Geographers of all countries reckon longitude from the meridian of Greenwich, although the local geography of many countries may be reckoned from their respective capitals. Greenwich Hospital, founded by Queen Mary, for disabled seamen "who protected the public safety in the reign of William and Mary, 1694," is located on the site of the palace where Henry VIII. and his daughters Mary and Elizabeth were born, and where Edward VI. died. The hospital consists of four distinct buildings, one of which was designed by Inigo Jones (q.v.), and the other three by Sir Christopher Wren (q.v.). James Stuart made the designs for the restored portion of the chapel; and the statue of George II., in the central square, is by Rysbrach. In 1873 Greenwich Hospital became the college for the Royal Navy. The Royal Hospital School for boys who may enter the navy, and the Blue-Coat School, are liberally endowed. Pop. about 187,000.

Greenwood, Grace. See **LIPPINCOTT, SARAH JANE (CLARKE).**

GREENWOOD CEMETERY — GREGORIAN CHANT

Greenwood Cemetery, N. Y., the principal burial place of New York and neighborhood, in South Brooklyn, near Gowanus Bay; area 475 acres. It occupies a picturesque site, and is laid out so handsomely as to make it almost without a rival in the world. From its heights the waters of New York Bay may be seen on the one hand, and the broad expanse of the Atlantic on the other. There are 20 miles of roadway and more than 25 miles of footpaths. Many distinguished men and women are buried here. The main gateway is adorned with four magnificent sculptures in *alto rilievo*, representing four scenes in the resurrection. The number of interments exceed 350,000.

Greer, David Hummell, American clergyman: b. Wheeling, W. Va., 20 March 1844. He was graduated from Washington College, Washington, Pa., in 1862, and studied theology in the Episcopal Seminary at Gambier, O. From Brown University and Kenyon College he received the titles of Doctor of Divinity and Doctor of Laws. His first ministry was at Covington, Ky.; from there he was transferred to Clarksburg, W. Va., and in 1871 he was called to Grace Church, Providence, R. I. In 1885, Dr. Greer became rector of St. Bartholomew's Parish, the most fashionable and richest of New York Episcopal parishes. In 1890 he established the St. Bartholomew's Parish House, at 42d street and 3d avenue, at a cost of \$400,000, built largely through the liberality of Cornelius Vanderbilt. This parish house embraces a wide field of charitable, missionary and educational work. In 1903 Dr. Greer was elected coadjutor to Bishop Potter of the New York Episcopal diocese. He had previously declined three bishoprics, that of coadjutor-bishop of Rhode Island, bishop of Pennsylvania, and bishop of Massachusetts to succeed Phillips Brooks. Upon Bishop Potter's death in 1908 Dr. Greer became bishop.

Greer, James Augustin, American rear-admiral: b. Cincinnati, O., 28 Feb. 1833; d. Washington, D. C., 17 June 1904. Entering the navy in 1848, he was promoted lieutenant in 1855, and was on board the *San Jacinto* when that vessel intercepted the English steamer *Trent*, on which were Mason and Slidell, the Confederate commissioners. He commanded the ironclad *Benton* in the fleet that passed the Vicksburg batteries; and in 1873 was in command of the *Tigress* in its search of the polar seas for the *Polaris*. He became rear-admiral in 1892 and was retired in 1895.

Greer, grē, Edward, American writer: b. Sandwich, Kent, England, 1 Dec. 1835; d. New York 1 Oct. 1888. After spending several years in Japan, he came to the United States in 1868, became a citizen, and engaged in commercial pursuits in New York. He published 'Young Americans in Japan' (1881); 'The Wonderful City of Tokio'; 'The Golden Lotus' (1883); 'The Captive of Love,' founded on a Japanese romance; 'The Loyal Ronins,' a translation from the Japanese, etc.

Gregarine, a parasitic sporozoan (see SPOROZOA) dwelling in the intestines of many insects, crawfishes, and other arthropods.

Gregg, David, American Presbyterian clergyman: b. Pittsburg, Pa., 25 March 1846. He was graduated at Washington and Jefferson College in 1865. He has been pastor in several

places, and since 1889 has preached in Lafayette Avenue Presbyterian Church, Brooklyn, N. Y. He is editor of 'Our Banner,' and among his many published volumes may be mentioned: 'Makers of the American Republic' (1896); 'Ideal Young Men and Women' (1897); 'Facts that Call for Faith' (1898); 'Things of Northfield and Other Things' (1899).





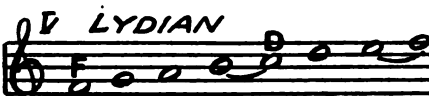
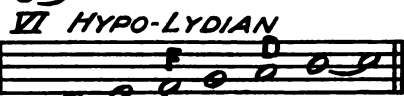
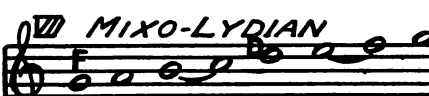

Grégoire, Henri, ön-rē grā-gwār, COUNT, French churchman and statesman: b. 4 Dec. 1750; d. Paris 28 May 1831. In 1789, while cure of Embarménil, in the district of Nancy, he was sent by the clergy of Lorraine as their representative to the States-General. As one of the secretaries of the constituent assembly he joined the extreme democratic section, and in the convention voted for the condemnation, though not for the death, of the king. Although extreme in his democratic opinions, he was an unflinching Jansenist. He was a member of the Council of Five Hundred, of the corps législatif, and of the senate (1801). On the conclusion of the concordat he resigned his bishopric of Blois. He voted against the establishment of the imperial government, and alone in the senate resisted the restoration of titles of nobility. He himself afterward accepted the title of count, but in the senate always opposed Napoleon, and in 1814 was one of the first to vote for his deposition. He left numerous works, among them 'Ruines de Port Royal' (1801); 'Essai Historique sur les Libertés de l'Eglise Gallicane'; 'Histoire des Sectes Religieuses depuis le Commencement de ce Siècle'; 'Annales de la Religion' (1795-1803).

Gregorian Chant (Latin, *cantus gregorianus*; *cantus planus*; *cantus firmus*; Italian *canto fermo*; French, *chant gregorien*, *plain-chant*; German, *gregorianischer Choral*) is as old as the Church itself. As an integral part of the liturgy, music has its origin in the celebration of the Last Supper. According to the evangelists, Matthew and Mark, after the consecration and breaking of bread, our Lord and the apostles sang a hymn, which is commonly accepted to have been the "Great Hallel" of the Jewish passover celebration, that is, the Psalms, cxii.-cxvii. (Douai version), inclusive. The first Christian communities of Jerusalem in Palestine and Antioch in Syria were founded by newly converted Jews. Consequently it is more than probable that, although the converts from paganism were soon in the majority, melodies in use in the temple and in the synagogues continued to be sung at their religious meetings. This hypothesis is all the more reasonable because the recruits from paganism could offer nothing either in the way of poetry or music which would have been acceptable to the new cult. As to how the chant came to Rome and concerning its early development, archæology has so far been unable to ascertain any definite information. Conjecture and probability are the most we have to go by. Without doubt Greek music, which was known to the Romans, as was every other form of Hellenic culture, had its influence on the formation of the Christian worship music. It is certain also that there was a constant development and that singing played an ever greater role in the early liturgy. There were hardly any religious functions of which the singing of psalms, responsories and hymns did not form a part. From the fruitful soil of

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the early Church sprang with great exuberance a new hymnology, which in turn, as its logical complement, was translated into melodies. Many of the latter were spontaneous improvisations, the children of ardent hearts and imaginations illumined by the New Light. At first the whole religious community participated in the singing, but as the liturgy became more elaborate and the assemblies more numerous, this participation on the part of all the faithful had to be restricted to certain portions of the service. Other, more particular parts were performed by the Primicerius, Præcentor or Monitor, who also had general charge of the singing and whose office it was to see that the faithful were well prepared for their allotted task. After emerging from the catacombs at the beginning of the 4th century the Church displayed its ever-growing vitality in the unfolding of her liturgy and the increasing splendor of her cult. At this period the chants used must have been numerous and varied. Popes and bishops fostered the liturgical music in every manner. Pope Sylvester (314) and Hilarius (461) founded schools for its cultivation. Saint Am-

permanent character and from whom it is named, ascended the papal throne, the number of feasts and consequently of liturgical chants had increased to such an extent that the four modes fixed by Ambrose were no longer sufficient. Many of the new melodies did not belong to any one of the scales enumerated above. They had grown beyond the original frame. As Gregory partly reformed and, at least in outline, gave shape to the ecclesiastical year as we now know it, he was compelled also to rearrange existing chants, reject inferior ones, adapt old ones to new texts and add new ones of his own creation. In order to carry out this vast plan he found it necessary to enlarge the tonal system then in use. He retained the four Ambrosian modes, which were henceforth designated as the *authentic* modes, and added thereto four more which he called *plagal*. Gregory formed the new modes by transposing the last four notes of the existing—authentic—scales an octave lower, so that each plagal mode began a fourth below the *authentic* from which it sprang. Thus the tonal system as completed by Saint Gregory was as follows:

AUTHENTIC MODES	PLAGAL MODES
<p style="text-align: center;">I DORIAN</p> 	<p style="text-align: center;">II HYPO-DORIAN</p> 
<p style="text-align: center;">III PHRYGIAN</p> 	<p style="text-align: center;">IV HYPO-PHYRGIAN</p> 
<p style="text-align: center;">V LYDIAN</p> 	<p style="text-align: center;">VI HYPO-LYDIAN</p> 
<p style="text-align: center;">VII MIXO-LYDIAN</p> 	<p style="text-align: center;">VIII HYPO-MIXO-LYDIAN</p> 

[N. B.—The letters F and D in the above diagram stand respectively for *final* and *dominant*. The *final* is the tone on which a melody finds repose, or a satisfactory ending. As will be observed, the *final* for any given authentic mode and its derived plagal are identical. The *dominant* is that tone which occurs oftenest or predominates in any melody.]

brose, Archbishop of Milan (397), took a step which was of greater importance than anything which had been done up to that time. He gave system and order to the melodies and chants in use in his archdiocese by giving them a theoretic basis. This he accomplished by adopting four modes or scales, each one of which had as its initial one of the four notes of the Tetrachord (sequence of four notes), D, E, F, G. The four modes adopted by Saint Ambrose were consequently: (a) (Dorian) D, E, F, G, a, b, c, d; (b) (Phrygian) E, F, G, a, b, c, d, e; (c) (Lydian) F, G, a, b, c, d, e, f; (d) Mixolydian, G, a, b, c, d, e, f, g. All the melodies and chants used had some one of these modes for their foundation. Saint Ambrose originated the custom of singing hymns and psalms antiphonally.

When 200 years later, Gregory the Great, the man who gave the music of the Church its

Four more modes were added to these in later centuries, but they are not different in essence from the eight named above. By means of various signs—dots, strokes, bars or hooks, collectively called neums—all of which had a conventional meaning, and which were placed over and alongside the words of the texts, Saint Gregory indicated the melodies to which these texts were to be sung. The book containing the chants for the numerous offices was called "antiphonarium cantorum." It was deposited near the altar of St. Peter so as to convey that the pontiff wished it to be considered as the norm for the whole Christian world.

In order to gain an insight into and an appreciation of the nature and character of the Gregorian melodies, it will be well to examine a little more closely the tonal material out of which they are constructed. We will notice that all the scales are diatonic, that is to say

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that each one has five whole tones or steps and two half-steps or semi-tones; furthermore that the half-steps or semi-tones occur in a different place in each scale, according to what the initial note happens to be, and, finally that only one of them has a *leading tone* or half-step between the seventh step and the octave or repetition of the initial note. It is these three features which differentiate the Gregorian modes so markedly from our modern scales and which give them that impersonal and objective character so marvelously suited to the purpose they serve, namely, that of expressing the ideas and sentiments conveyed by the sacred texts. In other words, these modes, or tonalities, lend themselves to the expression of a mental attitude of objectivity as against the modern scales which, on account of their chromatic character, are more pliable vehicles for conveying the emotions springing from subjectivism and introspection. If we remember, in addition to the general character of the Gregorian, or Church modes—as they are often called—the rule which permits the use of six intervals only in the formation of Gregorian melodies, namely: the major and minor second, the major and minor third, the perfect fourth and the perfect fifth, we realize that this tonal system is better adapted for the expression of reverence, humility, peace, and joy, whereas the modern chromatic system is more suited for the expression of passion and dramatic conflict.

Saint Gregory used every means at his command to propagate the chant and have it universally adopted. He established schools for its proper interpretation. At one of these he is said to have taught in person. Missionaries who were sent from Rome into foreign lands took with them a copy of the antiphonarium, and, of course, a knowledge of how the melodies it contained should be sung. Thus, Saint Augustine brought the melodies to England at the command of St. Gregory himself. The great pope's successors continued the process of propaganda during the following centuries. In the 8th century Saint Boniface introduced the chant in Germany, and by him several "scholæ cantorum" were established on German soil. Through Pepin and after him through Charlemagne, it found its way into Gaul and into the whole territory under the emperor's sway.

It is held by many historians that the original chant was, in the main, syllabic, that is to say, that only one note was sung to each syllable and that only the word "alleluja" was ever extended over several notes. Be that as it may, it is certain that it gradually developed into a melismatic system, syllables being often extended over smaller and greater groups of notes.

From the time of Saint Gregory until the advent of Guido d'Arezzo (995-1050?) the primitive means of determining the melody, the neums described above, remained in use. As has been pointed out, these signs were intended to assist the memory of the singers in reproducing the melodies which they had learned by oral transmission. It is not to be wondered at that, in the course of time, many of the melodies were altered and modified in the many places where they were in use. There were frequent variations and modifications due to local habits, different temperaments, but, above all, to the insufficiency of the means employed to indicate

with precision the form of the melodies. Careless copyists and finally the arbitrariness and caprice of singers in the various countries led to confusion. Before the time of Guido d'Arezzo, attempts had been made to fix with more precision the intervals of the melodies. He found in use two lines, a red and a yellow one, drawn across the page. Upon the red line was placed the F, and C was put upon the yellow one. Above, below and between these two lines the neums were written. By placing a black line between the two already existing and adding another above or below these three as the *ambitus* or range of the melody might require, Guido created the four line staff which has been used ever since for the chant, and made it possible to indicate precisely the form of a melody for all time to come. Guido and his pupils transcribed the existing chants into the new system of notation. Copies of these transcriptions found their way into the cathedrals and monasteries of many countries where they took the place of the books formerly in use. Though the neums as a *system of notation* were superseded by the more precise invention of Guido, they continued nevertheless to be employed to indicate the manner of *interpretation*. Although Guido's invention was epoch-making and of incalculable importance in the history of music, it must not be inferred that it was at once universally adopted. Neums as a means of notation continued in use in many places and institutions far into the 13th century. Nor must we imagine that because of the introduction of the new system of notation no further modifications of the chant took place. As new saints were canonized and new feasts instituted by the Church, offices and chants were necessarily created. Then the growing skill of professional singers gave rise, especially in the Alleluja following the gradual, to improvisations, elaborations and displays of virtuosity which often exceeded the limits of good taste and appropriateness.

As the melodies comprising ecclesiastical music grew out of the sacred texts and were never performed without being wedded to these texts, it is but natural to assume that the melodic construction partook of the rhythmical form of the texts. Especially must this have been the case when the chant was still largely syllabic. Some maintain that the ancient chant had a definite—artificial—rhythm, as in our modern music, in contradistinction to the natural, or that dictated by the rhythm of the text. Whatever the prevailing rhythm was at the beginning of the 10th century, it was now to undergo a gradual change. The monk Hucbald invented the *organum* or diaphony, that is, the practice of having a second voice sing the melody a fifth above or a fourth below the original, or add to the fifth also the octave, the first voice meantime maintaining the original melody. By this step Hucbald paved the way for the polyphony which was soon to develop and find its culmination in the wonderful creations of Palestrina and his school in the 16th century. Sulzer in his 'Allgemeine Theorie der Künste' in the article on harmony, points out that polyphony was latent in the unison singing of the Gregorian melodies by old and young, men and boys, each class of voice, soprano, alto, tenor, baritone, and bass, having a different pitch.

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Hucbald's system of parallel motion of fifths and octaves was soon succeeded by attempts at contrary motion, and counterpoint as we know it, that is, point against point (or note against note) was born. To the Gregorian melody which now became "*cantus firmus*," that is, unchangeable melody, were added one or more others. In giving birth to the new system and continuing to be its foundation and the source whence polyphony drew its life and being, the Gregorian chant lost its most distinguishing characteristic, that is, its natural rhythm. The themes taken from the chant and used by contrapuntists as "*canti fermi*" were forced into the rhythmical straight-jacket. Each note of the *cantus firmus* had now to assume a definite value in order that the added melodies simultaneously sung might harmonize with it. Polyphony, or the new school of music, increased in favor very rapidly to the detriment of the old chant. Instrumental music, which was gradually developing, also had a deteriorating influence on the execution and cultivation of the ancient music of the Church. Counterpoint in many instances lost its original purpose and degenerated into artificiality. Composers used it to display their skill rather than to give expression to the ideas and emotions latent in and suggested by the text to which it was wedded. A reform movement toward primitive simplicity set in toward the end of the 15th and the beginning of the 16th century. The Council of Trent enacted laws concerning the abuses that had crept into the chant as well as against the extravagances which the display of skill for its own sake had brought about and which in fact almost caused the total exclusion of figured music from the Church. In a brief dated 25 Oct. 1577, Pope Gregory XIII. directs Giovanni Perluigi Palestrina and Annibale Zoilo (Palestrina was at the time director of the papal choir and Zoilo a member of the same) to revise the chants contained in the "*Antiphonaria*," "*Gradualia*," and "*Psalterium*," and "eliminate" therefrom "all barbarisms, obscure passages, contradictions, and superfluous additions which, through the ignorance, neglect, and also through the malice of composers, copyists, and singers, have crept into these books." A pupil of Palestrina, Giovanni Guidetti, had, a few years previously, edited the various chants for the celebrant contained in the Missal, which had been newly revised by a commission of cardinals appointed for this purpose after the Tridentine Council. Palestrina, Zoilo, and Guidetti in their labors of revision acted upon the principle which had been lost sight of for a time, but which was now generally accepted by musicians in Rome, "that the words of the texts should be sung to the notes as they ought to be spoken or declaimed without notes." This principle in its application brought into universal use the three different kinds of note-values: the *longa*, the *brevis*, and the *semibrevis*. The work of revision, of the *Graduale* only, which was continued and completed after Palestrina's death (2 Feb. 1594) by Felice Anerio and Francesco Suriano involved many excisions and abbreviations; reduced many chants which had been elaborately melismatic to a syllabic form. This revised edition derived its name "*editio medicea*," from the fact that it was printed by the "*stamperia*" or press of that name established in Rome by Cardinal

Ferdinand de Medici. The Congregation of Sacred Rites, in 1595, appointed Giovanni Maria Nanino, Giovanni Andrea Dragoni, Luca Marenzio, and Fulgentio Valesio to edit, in accordance with the principles stated above, the "*Pontificale Romanum*." The revised books were now printed and published with the approbation of Pope Paul V. (1605-21) and that of the prefect of the Congregation of Sacred Rites. This approbation did not carry with it the prohibition of the use of the old, more elaborate, now called traditional, versions of the chant. No doubt because of the latitude thus permitted, the abbreviated version did not make much headway outside of the papal territory. Besides this, monody (solo singing) and the theatrical style in general came into vogue in Italy at the beginning of the 17th century. It took such a hold of public taste that even the works of Palestrina and the masters of his school were temporarily forgotten for the trashy and trivial products which now had the upper hand. This being the case with regard to the polyphonic style, it was natural that the austere, chaste, and simple Gregorian melodies should suffer even greater neglect. While in Italy and in some other parts of the world the chant was for a time neglected, there were countries, such as France, Belgium, Spain, and the Catholic parts of Holland, where it never ceased to be cultivated according either to the traditional or the abbreviated version. Many different editions came into use, notably in France, where many dioceses had their own versions. Toward the middle of the 19th century the plan entertained by Gregory XIII., Clement VIII., and Paul V., of having uniformity for the whole Catholic world in everything pertaining to the liturgy, including the chant, was revived with new vigor. Pope Pius IX., in 1868, appointed a commission to whom he entrusted the task of editing, in accordance with existing requirements, the "*editio medicea*," which Pius IX. and his successor, Leo XIII., repeatedly declared to be the official version of the Gregorian chant for the whole Church. During the past 30 years or more, however, archaeologists—notably the Benedictines of Solesmes, A. Dechevrens, S. J. of Paris, the Belgian savant, G. A. Gevaerts, Dr. Peter Wagner of Freiburg, Switzerland, and others—have made exhaustive studies of the manuscripts dating from the 9th century (the oldest so far discovered) up to the Renaissance. The results of these studies have induced the present Pope, Pius X., to appoint (1904) a commission for the purpose of preparing what is to be called the "*editio vaticana*," which will embody the fruits of the researches and labors of learned men for many years past. Whatever may be the differences between this latest version and the many that have gone before, they will in no sense change the essential character of the chant. This character has its root primarily in the nature of the scales or modes used, as has been shown above, and, secondly, in the intervals in the construction of the melodies. As has been pointed out, the melodies sprang from the sacred texts of the liturgy: they were their complement and splendor. The Church has always declared the chant to be her own music *par excellence*. Other forms of music which she admits in her cult, the Palestrina, or polyphonic, and the mod-

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ern styles, are to be judged as to their fitness in the light of the Gregorian chant, which is the norm and standard of excellence because it best expresses the attitude of prayer.

Bibliography.—Some of the works on the Gregorian chant which may be profitably consulted are: Haberl, 'Magister Choralis'; Kienle, 'Choral-Schule'; Gietmann, 'Kunstlehre' (Vol. III.); Kornmüller, 'Lexikon der Kirchlichen Tonkunst'; Gevaert, 'La Melopée Antique dans le Chant de l'Eglise Latine'; the Benedictines of Solesmes, 'Paléographie Musicale'; Dechevrens, *Études de Science Musicale*.

JOSEPH OTTEN.

Gregorian Liturgy, the ritual which Pope Gregory I. introduced after 590 in the Roman Catholic Church in the administration of the Eucharist, as exhibited in the book entitled 'Gregorianum Sacramentarium.' St. Gregory made a new arrangement of the liturgy of Gelasius, which was previously in use, expunging from it what seemed to him useless and adding a very few new prayers. The celebration of the mass is still essentially the same as it was then.

Gregory, Saint, or Gregory of Armenia, surnamed "THE ILLUMINATOR," founder of the Armenian Church: b. Valarshabad, Armenia, 257; d. Mount Sebu, Upper Armenia, 332. He was conveyed by a Christian nurse from his home in Armenia, when but two years old, to Cæsarea in Cappadocia to escape being slain with his family for the crime of his father Prince Auak, who had assassinated Chosrov I., king of Armenia. When he reached manhood he married a Christian lady of Cæsarea, who after bearing him two sons retired to a monastery. Thereupon Gregory entered the service of Tiridates III., son of Chosrov, who, with the help of the Romans, had recovered his father's throne. Tiridates imprisoned him for 14 years in a deep pit, for refusing to perform an act of idolatrous worship, whereupon the tyrant was punished by a horrible temper, of which Gregory cured him and converted him to Christianity. After the baptism of Tiridates Gregory was appointed bishop and patriarch of Armenia and consecrated by Leontius of Cæsarea. Tiridates established Christianity as the national religion of Armenia, a measure afterward imitated on a larger scale by Constantine the Great. Gregory spent the last year of his life in a hermitage on Mount Sebu.

Gregory, Saint, of Nazianzus (GREGORIUS NAZIANZENIUS), Greek Church Father: b. Arianzas, near Nazianzus, Cappadocia, about 330; d. about 390. Receiving baptism, he retired for some time with St. Basil to Pontus. He began to preach in 362 and between 365 and 374, chiefly at Nazianzus. He went to Constantinople about 378 or 379 to oppose the Arians, and was appointed patriarch of that see in 380. The election was confirmed by the Council of Constantinople in 381, but during the same year he resigned and retired to his former charge of Nazianzus. We possess a number of sermons by him, a large number of letters and many poems. His eloquence is said to have placed him nearly on a level with Basil and Chrysostom. His festival is celebrated on 9 May.

Gregory, Saint, of Nyssa, Greek Church Father: b. Sebaste Pontus, about 332; d. about 398. By the influence of his brother St. Basil

(q.v.), he was made bishop of Nyssa, in Cappadocia. He took a prominent part in the Councils of Constantinople from 381 to 394. He was less of an orator than Gregory of Nazianzus, but was more distinguished than any of the Greek fathers for a philosophical spirit, and for his acquaintance with the writings of the Greek philosophers. He also exhibited a liberality in his views uncommon in his day. His festival is on 9 March. His works consist of dogmatic treatises, Scripture commentaries, sermons, letters, etc.

Gregory, the name of 16 popes, as follows:

Gregory I., called the "GREAT": b. Rome about 540; d. 12 March 604. The death of his father put him in possession of great wealth, which he expended in the foundation of monasteries and charitable institutions. Disgusted with the world, he took the monastic vows himself and became a member of one of his own establishments. On the death of Pope Pelagius in 590 he was chosen his successor, an honor which he very unwillingly accepted. He displayed great zeal for the conversion of heretics, the advancement of monachism and the rigid enforcement of celibacy among the clergy; and there was nothing in which the Church was concerned that he deemed too small to lie beyond the sphere of his personal interest and action. (See GREGORIAN LITURGY, GREGORIAN MUSIC.) During his pontificate the pretension of John, patriarch of Constantinople, to the title of ecumenical patriarch, which Gregory repudiated, contributed to bring about the schism between the Greek and Latin Churches (see GREEK CHURCH). The works ascribed to him are very numerous, and have been frequently published. His genuine writings consist of a treatise on 'Pastoral Duty' (translated by King Alfred), 'Letters,' 'Scripture Commentaries,' etc. Consult: Snow, 'St. Gregory the Great' (1892); Mann, 'Lives of the Popes in the Early Middle Ages' (1903).

Gregory II.: b. Rome; d. 10 Feb. 731. He was elected pope and his pontificate is specially noticeable as forming an epoch in the progress of the territorial pre-eminence of the Roman See in Italy. Gregory II. was distinguished by his zeal for the evangelization of heathen lands; it was under his auspices that the famous Winfried or Boniface entered on his missionary work in Germany.

Gregory III.: b. Syria; d. 28 Nov. 741. He succeeded Gregory II. in 731. The encroachments of the Lombards in Italy during his pontificate became so formidable that as the eastern emperors still remained powerless or indifferent to the protection of the Italian provinces, the Romans charged Gregory to send a deputation to Charles Martel, which promised him the title of patrician and consul of Rome in return for his help against the Lombards. Charles Martel's preoccupation with the Saracens made it impossible for him to respond to this plea. But the fact that Gregory was authorized by the Roman primus to approach Charles on this subject and in this way shows how Rome was breaking away from the East, and so marks an epoch.

Gregory IV.: b. Rome; d. 27 Jan. 844. He succeeded Valentine in 828, and was greatly

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esteemed for his learning and piety. During his pontificate the observance of the feast of All Saints was made general.

Gregory V.: b. Germany; d. 18 Feb. 999; sometimes styled BRUNO OF CARINTHIA. He was nephew of the Emperor Otto III. and through his influence was chosen first German pope and at the age of 24 succeeded John XV., in 996. An anti-pope, named John XVII., was set up against him by Crescentius, a consul of Rome, but was expelled by the emperor.

Gregory V., Ecumenical patriarch of the Greek Church: b. Dimitzana, Arcadia, Greece, 1739; d. Constantinople, 1821. His original name was Georgios Angelopoulos, and he took his ecclesiastical name on entering the monastery on Mount Athos where he received his theological training. He was appointed archbishop of Smyrna in 1784 and patriarch of Constantinople in 1795. When the French invaded Egypt in 1798, the national spirit of Greece was aroused by hopes of deliverance from the Turkish yoke. Suspicions of conspiracy fell upon Gregory, and the Turks clamored for his head. Sultan Selim therefore banished him to Athos, but he was soon afterwards reinstated in his see. In 1821 the Greeks of the Morea revolted, and 21 March banishment was proclaimed against all who took part in the rebellion. Gregory had been put in charge of the family of Prince Murusi, who without the patriarch's connivance had been permitted to escape by the Russian ambassador. On Easter morning, 22 April, 1821, by command of the sultan Gregory with three bishops and eight of the clergy were hanged in front of the basilica. Three days later the Jews threw his body into the sea, where it was recovered by Greek sailors and carried to Odessa. The Greeks looked upon their murdered archbishop as a martyr, his bones were placed by the government in the cathedral at Athens, and his statue was raised in front of the university. Among his writings is a translation of St. Paul's epistles into modern Greek, with a commentary.

Gregory VI.: b. Rome; d. Cologne 1048. He succeeded John XIX. Finding the lands and revenues of his church much lessened by usurpations, and the roads infested by robbers, he acted with such vigor that a powerful party was raised against him by those accustomed to live by plunder. At a council, held at Sutri, in 1046, Gregory abdicated the pontificate.

Gregory VII. (HILDEBRAND): b. Soana, Tuscany, about 1015; d. Salerno, 25 May 1085. He became a monk at Cluny, and when Bruno, bishop of Toul, was elected pope by the emperor and died in 1048 Hildebrand accompanied him to Rome, having persuaded him, it is said, to lay aside the insignia of the pontificate until he should receive the free suffrages of the clergy and people of Rome. Henceforth Hildebrand became the ruling spirit of the papacy. Leo IX. (Bruno) and his successors, Victor II. (1055), Nicholas II. (1058), Alexander II. (1061), confided in his counsels. He influenced the election of several of these popes, and procured the expulsion of the anti-popes Benedict and Honorius, who were opposed to Nicholas and Alexander. Under Nicholas II he succeeded in changing the mode of election to the pontificate. Hitherto the clergy and the people of Rome had a voice in the election. He gave the power of

nomination to the cardinals alone, leaving the clergy and people only a right of concurrence, of which they were subsequently deprived. On the death of Alexander II. (1073) Cardinal Hildebrand was raised to the Papal chair. His efforts were directed to free the Church from the interference of temporal rulers, which had become quite an abuse in his day, and reform the numerous irregularities which had crept in among the clergy, especially in relation to the violation of the law of celibacy. In 1074 he issued his edicts against simony and the marriage of priests, and in 1075 an edict forbidding the clergy, under penalty of forfeiting their offices, from receiving the investiture of any ecclesiastical dignity from the hands of a layman, and at the same time forbidding the laity, under penalty of excommunication, to attempt the exercise of the investiture of the clergy. The Emperor Henry IV. refused to obey this decree, and Gregory, in 1076, issued a new decree summoning the emperor before a council at Rome, to defend himself. Henry then caused a sentence of deposition to be passed against the pope by a German council assembled at Worms. The pope, in return, excommunicated the emperor, and released all his subjects and vassals from their oath of allegiance. To escape being deposed by the pope, Henry hastened to Italy, where he submitted at Canossa (1077) to a humiliating penance, and received absolution. In the meantime his friends again assembled round him, and he then caused the pope to be deposed by the Council of Brixen, and an anti-pope, Clement III., to be elected in 1080, after which he hastened to Rome and placed the new pope on the throne. Gregory now passed three years as a prisoner in the castle of St. Angelo, but could never be induced to compromise the rights of the church. The character of Gregory was ardent and unyielding. In the pursuit of his ends in guarding the liberties of the Church he spared neither friend nor foe. The long dispute he began with Henry IV. about investitures survived both pope and emperor. The same subject involved him in disputes with France and England. He carried out his ecclesiastical reforms with an unbending rigor. He vigorously prosecuted those of the clergy who broke the law of celibacy, and in his contests with the emperors vindicated the spiritual authority of the Church as independent of the secular power. To the last he refused to withdraw the excommunications he had launched against the emperor, the anti-pope, and their adherents. The words which have been put into his mouth in dying, whether authentic or not, do no injustice to his inflexible spirit, "I have loved justice and hated iniquity; therefore I am left to die in exile." See Milman 'Latin Christianity' (Vol. III.); Giesebrecht, 'Geschichte der deutsch-Kaiserzeit' (Vol. III.); Bowden, 'Life of Gregory VII.' (1840); Voigt, 'Hildebrand als Papst' (2d ed. 1846); Gfrörer, 'Papst Gregor VII.' (1859-61); Stephens, 'Hildebrand and his Times' (1888); and the studies by Sötl (1847), Villemain (1872; Eng. trans. 1873), Langertson (1874), and Meltzer (1876).

Gregory VIII.: b. Benevento; d. Pisa 17 Dec. 1187. He succeeded Urban III. in October 1187, and died the same year, after having exhorted the Christian princes to undertake a new crusade, and absolved Henry II. of England for the murder of Becket.

GREGORY—GREGORY OF TOURS

Gregory IX. (UGOLINO, COUNT OF SEGNI), b. Campania about 1147; d. Rome 21 Aug. 1241. He became a bishop of Ostia and cardinal, and in 1227 succeeded Honorius III. The principal events of his pontificate were the various incidents of his contest with the great Emperor Frederick II, whom he four times excommunicated, absolving his subjects from their allegiance, and proclaiming a crusade against him. The 'Decretals,' which he published in 1234, form the basis of the canon law of the Church.

Gregory X. (TEBALDO VISCONTI), d. Arezzo, 10 Jan. 1276. He was elected Pope in 1271, after an interregnum of two years. He convened a council at Lyons in 1274, the chief purpose of which was to promote a union between the Eastern and Western Churches.

Gregory XI. (PETER ROGER), b. Maumont, Limoges, France, 1329; d. Avignon, 30 Dec. 1378. He was a nephew of Clement VI., and succeeded to the pontificate in 1370, after the death of Urban V. He was a patron of learning, and endeavored to reconcile the princes of Christendom and to reform the religious societies. He transferred the papal see from Avignon to Rome.

Gregory XII. (ANGELO CONARIO), b. Venice about 1325; d. 18 Oct. 1417. He became pope in 1406, during the great schism of the West, Benedict XIII. being the other pope. Both were deposed by a council held at Pisa, and Alexander V. elected in their stead. Gregory abdicated at the Council of Constance in 1415, and thenceforward held the rank of cardinal-bishop of Porto.

Gregory XIII. (UGO BUONCOMPAGNO), b. Bologna 7 Jan. 1502; d. 10 April 1585. He was one of the theologians of the Council of Trent; on his return thence was created cardinal in 1565. On the death of Pius V. Gregory was elected pope in 1572. Not one among the post-Reformation pontiffs has surpassed Gregory XIII. in zeal for the promotion and improvement of education; a large proportion of the colleges in Rome were wholly or in part endowed by him. The most interesting event of his pontificate, in a scientific point of view, is the correction of the calendar (q.v.), which was the result of long consideration, and was finally made public in 1582. Under his care was published also a valuable edition of the 'Decretum Gratiani' with learned notes. He was a zealous patron of the Jesuits, and supported the League in France against the Huguenots. He strongly supported Philip II. of Spain in his designs against England; and left the mark of his energy on almost every department of church life and work.

Gregory XIV. (NICHOLAS SFONDRATE), b. Cremona 1535; d. 15 Oct. 1591. He was made a cardinal in 1583 and succeeded Urban VII. in 1590.

Gregory XV. (ALESSANDRO LUDOVICO), b. Bologna 9 Jan. 1554; d. 8 July 1623. He became a cardinal in 1616 and succeeded Paul V. in 1621. He was the founder of the College of the Propaganda, and in 1622 canonized Ignatius Loyola, Francis Xavier and Philip de Neri.

Gregory XVI. (BARTHOLOMEO CAPELLARI) b. Belluno 18 Sept. 1765; d. Rome 1 June 1846. He was made prefect of the Propaganda in 1826 and was in effect minister of foreign

affairs. He succeeded Pius VIII. in 1831. His rule was a period of no ordinary interest and difficulty in the history of the Church, and in the relations of the Vatican with the temporal powers of Christendom. Of simple habits he was very active in his conduct of affairs. His 'Triumphs of the Papacy' (1790) has been translated into both German and French.

Gregory, Casper René, American scholar: b. Philadelphia, Pa., 1846. Was graduated at the Universities of Pennsylvania, Princeton and Leipsic (1864-76). He has done important work in New Testament criticism, and has been professor of New Testament exegesis in the theological faculty at Leipsic. In addition to translations of critical works from the German, he has written 'Les Cahiers des Manuscrits Grecs' (1885); and the 'Prolegomena to Tischendorf's Editio Octava Critica Major of the New Testament' (1893).

Gregory, Edward John, English painter: b. Southampton, 1850; d. 22 June 1909. He first exhibited at the Royal Academy in 1876, and became known as a genre painter of distinction, whose lightness and refinement, combined with rare technique, were almost more French than English. His most characteristic pictures are 'A Rehearsal' (1882); 'The Swans of the Thames'; and 'Is it a Mouse?'

Gregory, Eliot, American painter and author: b. New York 13 Oct. 1854. He studied at Yale, obtained his education in art at Rome, and at Paris as a pupil of Cabanel and Carolus-Duran, and exhibited both sculpture and painting at the Salon. His pictures include genre works and portraits, among the latter being those of Admiral Baldwin, Ada Rehan and August Belmont. His books, published under the pseudonym "AN IDLER," are: 'Idler Papers'; 'Worldly Ways and By-Ways' (1898); and 'The Ways of Men' (1900), containing satirical observations on American life, especially that of plutocratic society.

Gregory, Francis Hoyt, American admiral: b. Norwalk, Conn., 1789; d. 1866. He was appointed midshipman in the United States navy in 1809, and during the war of 1812 was attached to the command of Commodore Chauncey on Lake Ontario. He was captured by the English in 1814 and confined till the close of hostilities. He saw service in repressing the Algerine pirates (1815-16) and the buccaneers of the West Indies (1821-23); took part in the Mexican War and commanded the African squadron (1849-52). He retired with the rank of rear-admiral in 1862.

Gregory, John Milton, American educator: b. Sand Lake, N. Y., 16 July 1822; d. Washington, D. C., 20 Oct. 1898. After graduation at Union College in 1846, he entered the Baptist ministry, but soon relinquished preaching for teaching. He was State superintendent of public instruction in Michigan in 1858-63; president of Kalamazoo College 1863-67; and president of the Industrial University in Champaign, Ill., in 1867-80. He published 'Compend of the School Laws of Michigan'; 'Handbook of History' (1866); 'A New Political Economy' (1882); 'Seven Laws of Teaching' (1883); etc.

Gregory of Tours (GREGORIUS FLORENTIUS), historian of Gaul, b. Averni, now Clermont,

GRENADA — GRESHAM

France, 538; d. Tours 17 Nov. 593. He lived some time at the court of Austrasia, and became bishop of Tours in 573. His 'Historia Francorum,' though destitute of style or method, contains an invaluable collection of facts bearing on the manners of the Franks and Gallo-Romans, and the historical events of the period, and has caused him to be ranked as the Herodotus of Gaul. He also wrote lives of fathers, ecclesiastics and martyrs, etc. His complete works are contained in Migne's 'Patrologia' (Vol. LXXI.), and his history is included in the first volume of the 'Monumenta Germaniæ Historica' (1884-85).

Grenada (grèn-à'da) and **Grenadines**, grèn-à-dēnz', islands of the West Indies. Grenada is the most southern of the Caribbean chain, and may be characterized as the most British and the most beautiful of all the British Antilles. Its length is 18 miles, its width 7, and its area 33 square miles. Lofty volcanic craters rise high above fertile and well-watered valleys. The volcanic character of the island is perhaps more marked, and is certainly regarded by geologists as being more recent than that of the northern Caribbees. A lake two miles in circumference lies among the mountains just mentioned, at an altitude of 3,200 feet. St. George, the capital, has a good harbor, a fort, and pretty houses and churches. The island is headquarters of the government of the Windward group (which includes with this the Grenadines, St. Vincent and St. Lucia), and has excellent schools, roads, waterworks, etc. The chief product is cocoa. Population about 54,000, of which number four-fifths are negro peasants. The Grenadines are long, low islands "of quaint forms and euphonious names," lying between Grenada and St. Vincent. The largest of them is less than 8,000 acres in extent, and their total area is approximately 87 square miles. They have in all more than 6,000 inhabitants, who raise and export cattle and provisions.

MARRION WILCOX,

Authority on Spanish America.

Grenade, grē-nād', a small hollow ball, cylinder, or cube, of metal, glass, or paper, about two and one half inches in diameter, which is filled with some explosive, and burst by means of a fuse when it falls among the enemy. Until about the end of the 17th century trained soldiers called grenadiers threw grenades by the hand. Grenades have been delivered from mortars, to repel the close attacks of besiegers sheltering themselves under the besieged walls. They have been found useful also in repelling boat attacks. At the siege of Mafeking in 1899-1900 dynamite grenades are said to have been thrown by the besieged. Grenades were one of the earliest forms of explosive projectiles. The gradual disuse of hand-grenades in war dates from the battle of Steinkerque in 1690. Hand-grenades are in use at the present time as fire extinguishers, chemicals being used to fill hollow glass balls, which are thrown into a burning mass. Many hotels, hospitals and public buildings are equipped with hand-grenades.

Grenfell, George, English missionary and African explorer: b. Penzance, Cornwall, England, 1848; d. Basoko, Congo Free State, 1 July 1906. In 1874 he was despatched to Kamerun, Central Africa, where he founded the

settlement of Victoria. He later reached the Congo, and rendered good services to science by his hydrographic survey of the Congo valley during his voyage in the steamboat "Peace." Notable was his exploration of the Ubangi (1885) whose identity with the Welle Makua he convincingly established. The geographical societies of Germany, France and England, published valuable communications from this intrepid traveler, who shares with Livingstone the reputation of a missionary who did much to promote an accurate scientific knowledge of interior Africa.

Grenville, George, English statesman: b. 1712; d. 13 Nov. 1770. He became treasurer of the navy in 1754, secretary of state in 1762, and first lord of the treasury and chancellor of the exchequer in April, 1763. In 1765 the Commons accepted his scheme for stamp-duties to be levied in the American colonies, which was one of the proximate causes of the American War of Independence. In 1766 he defended the stamp act in Parliament; in 1769 opposed the expulsion of Wilkes from the House of Commons, and in 1770 brought in the Controverted Elections Bill, which was passed. He was able, hard-working and honest, but narrow-minded and obstinate, wanting in tact and foresight. The 'Grenville Papers,' edited by W. J. Smith (1852-53), contain interesting information on the politics of the day.

Grenville, Sir Richard, English naval officer: b. about 1541; d. September 1591. In 1585 he commanded a fleet of seven vessels intended to aid in the colonization of Virginia. His most brilliant exploit occurred in 1591, when he attempted to cut his way through a Spanish fleet of 53 ships. His ship while becalmed was attacked by 15 of the largest Spanish vessels. Not till after 15 hours of battle and when only 20 out of his 150 men were left alive did he strike his colors. He died from wounds received in the engagement. It is upon this incident that Tennyson has founded his spirited ballad, 'The Revenge.'

Grenville Act, 6 April 1764. An act passed by the English Parliament on the proposal of George Grenville, a member of Lord Bute's ministry. Its purpose was more effectively to protect English trade and manufactures from foreign competition, to raise better revenues from the colonies. It was based on the act of 1733, which, to protect the British West India sugar industry, laid prohibitory duties on the import of French West India sugar and molasses into the colonies, and which, if enforced, would have ruined New England commerce. The new act made the duty on molasses a heavy revenue one instead; increased the duty on sugar, and laid new duties on wines; decreased the drawbacks on foreign articles exported to America; imposed regulations on manufacturers, and attempted to enforce the navigation acts more thoroughly; and prohibited all trade between the colonies and the French islands St. Pierre and Miquelon.

Gresham, Walter Quinton, American jurist and statesman: b. near Lanesville, Harrison County, Ind., 17 March 1832. His family originated in Kentucky, from which State his grandfather had removed to Indiana. There his father met with success as a farmer, and

GRESHAM'S LAW—GREVY

also exercised the art of cabinet-making. He was elected sheriff and was murdered in the performance of his duties. The son was educated at the local school, and the State University, Bloomington, Ind. After leaving the latter he went to Corydon, Ind., and began the study of law, while filling the office of deputy clerk (1854). In 1860 he was elected to the State legislature. When the Civil War broke out he was commissioned in the Federal service as lieutenant-colonel of the 38th Indiana regiment. He was promoted under Grant, and at Vicksburg had charge of a brigade with the rank of brigadier-general of volunteers. He joined Sherman's forces in the expedition against Atlanta, Ga., where he commanded the 4th division of the 17th Army Corps. At Leggett's Hill, in January, 1864, he was severely wounded and disabled from service, and in the following year was retired as major-general of volunteers. He chose as his home New Albany, Ind., and began an active life as law practitioner. In 1866 he was put forward by his friends as Republican candidate for Congress, but was defeated at the polls, and for the two following years resided in New York, as the financial agent of his State. His next field of activity was as a jurist, for in 1869 President Grant appointed him judge of the United States circuit court for Indiana. He had previously declined an appointment as collector of customs at New Orleans, which would have necessitated his removal from Indiana. He had also declined the position offered him as district attorney. But his great abilities and high character had pointed him out as fitted for some important employment, and in 1882 no surprise was felt, but rather general expectation was satisfied when he received an appointment to the cabinet with the portfolio of postmaster general (1882). In 1884 he was called to the secretaryship of the treasury, in the discharge of whose duties he would doubtless have increased his reputation as a financier, had he not been appointed a few months later as United States circuit judge for the 7th judicial district. He made himself conspicuous as favoring the third term of his old friend Gen. Grant (1880). His own name had been put forward with some enthusiasm as presidential candidate in 1884, and again in 1888. There were many who thought that he had good claims to be invested with the office of the chief magistrate. Subsequently he changed his convictions on the most important question of the hour, and ranged himself on the side of views of tariff legislation with which the Republican party had no sympathy. The Populists, however, looked upon him with favor as his judicial decisions had in many cases been to their advantage. Had he consented, they would have nominated him for the presidency at the national convention of that party held at Omaha, Neb., in July 1892. He declined the honor and made a public statement announcing his purpose of supporting Grover Cleveland's nomination. He was afterward named by President Cleveland as secretary of state.

Gresham's Law, a principle in finance and political economy formulated about the middle of the 16th century by Sir Thomas Gresham, founder of the London Royal Exchange. It may be thus stated and expounded. Bad

money drives out good money from the circulation. The good coin of full weight and purity in circulation with worn, light, or depreciated coins, will be hoarded or used for exportation, where it will buy more abroad than the worn out coins, which will be left to pass as counters at home. This law is still a living principle, and especially applicable in controverting the position of those who wish the United States, single-handed, to issue a currency of the double standard.

Greswell, William Henry, English Anglican clergyman and author. He was educated at Oxford and has been rector of Dodington, Somerset, from 1888. As a writer he is known by 'Our South African Empire' (1885); 'Imperial Federation' (1887); 'History of the Canadian Dominion' (1890); 'Geography of the Canadian Dominion' (1891); 'Geography of Africa South of the Zambesi' (1892); 'The British Colonies and Their Industries' (1893); 'Growth and Administration of the British Colonies' (1897).

Gretna, La., town, capital of Jefferson Parish; on the Mississippi River and the Southern Pacific railroad; opposite New Orleans. A number of the Mississippi River packet lines take on and discharge shipments at Gretna. It was founded in 1835, and has now many of the advantages of a suburb of New Orleans. It manufactures cottonseed oil and its trade is chiefly in cotton and cottonseed oil. Pop. 3,875.

Gretna Green, or **Graitney**, Scotland, village in Dumfriesshire, on the Solway Frith, eight miles north of Carlisle. It was for nearly a century notorious as the place of celebration of the marriages of runaway couples from England. To conclude a lawful marriage in Scotland, it was then only necessary for an unmarried couple to go before witnesses and declare themselves man and wife. The English marriage service was usually read at these marriages by a pseudo-priest, said to be the blacksmith of the village, who has become in consequence a historical character in fiction. Gretna Green marriages are now at an end, in consequence of a statute which enacts that no irregular marriage contracted in Scotland shall be valid, unless one of the parties resides in Scotland, or has done so, for 21 days next preceding such marriage.

Grétry, André Ernest Modeste, än-drä ér-nä mö-děst grä-tré, French composer: b. Liège 8 Feb. 1741; d. Ermenonville 24 Sept. 1813. After completing his studies at Rome he settled at Paris and there his reputation was made. He was the most prolific composer of his age. He produced forty comic operas, most of which with the exception perhaps of 'Raoul' and 'Richard Cœur de Lion' are now forgotten. His 'Memoires' 1796, and his life by Gregoir and Brenet give the main incidents of his career.

Greville, Henry. See DURAND, ALICE MARY.

Grevy, François Paul Jules, frän-swä pôl zhül grä-vê, French statesman: b. Mont-sous-Vaudrey, Jura, 15 Aug. 1807; d. 9 Sept. 1891. He studied law in Paris, and became prominent as the defender of republican political prisoners. In 1848 he was returned to the Constituent Assembly, where his ability as a speaker soon

made him distinguished. After the *coup d'état* he retired from politics, but in 1869 again entered the Assembly as deputy for the Jara. In February, 1871, he was elected president of the National Assembly, and re-elected in 1876, 1877, and 1879. When Marshal MacMahon resigned in 1879 Grey was elected president of the republic for seven years. In December, 1885, he was elected president for a second term of seven years, but, hampered by ministerial complications, resigned in December 1887.

Grey, Albert Henry George, Fourth Earl, English statesman: b. Howick, Northumberland, England, Nov. 28, 1851. His grandfather, the second earl, was prime minister of England, and influential in securing the passage of the Reform Bill of 1832. The present earl was graduated from Trinity College, Cambridge; in 1880 he was elected to Parliament, as a Liberal, and supported Gladstone in the House until 1886 when the Liberals declared in favor of home rule. He then became a Liberal Unionist, but lost his seat in Parliament. In 1894, as his uncle died childless, he succeeded to the estate and title, and entered the House of Lords. He was a personal friend of Cecil Rhodes, was one of the promoters of the South African Company, and in 1896-97 served as governor of Rhodesia. As an executor of the Rhodes will, he is now one of the trustees of the scholarship fund. He has been an active worker in reform movements, especially in the cause of co-operation and of temperance. On his estate he has organized a co-operative system which has worked successfully; and in 1901 he organized a system for the management of public houses in the interests of the public, known as the Public House Trust. In 1904 he was appointed governor-general of Canada to succeed the Earl of Minto.

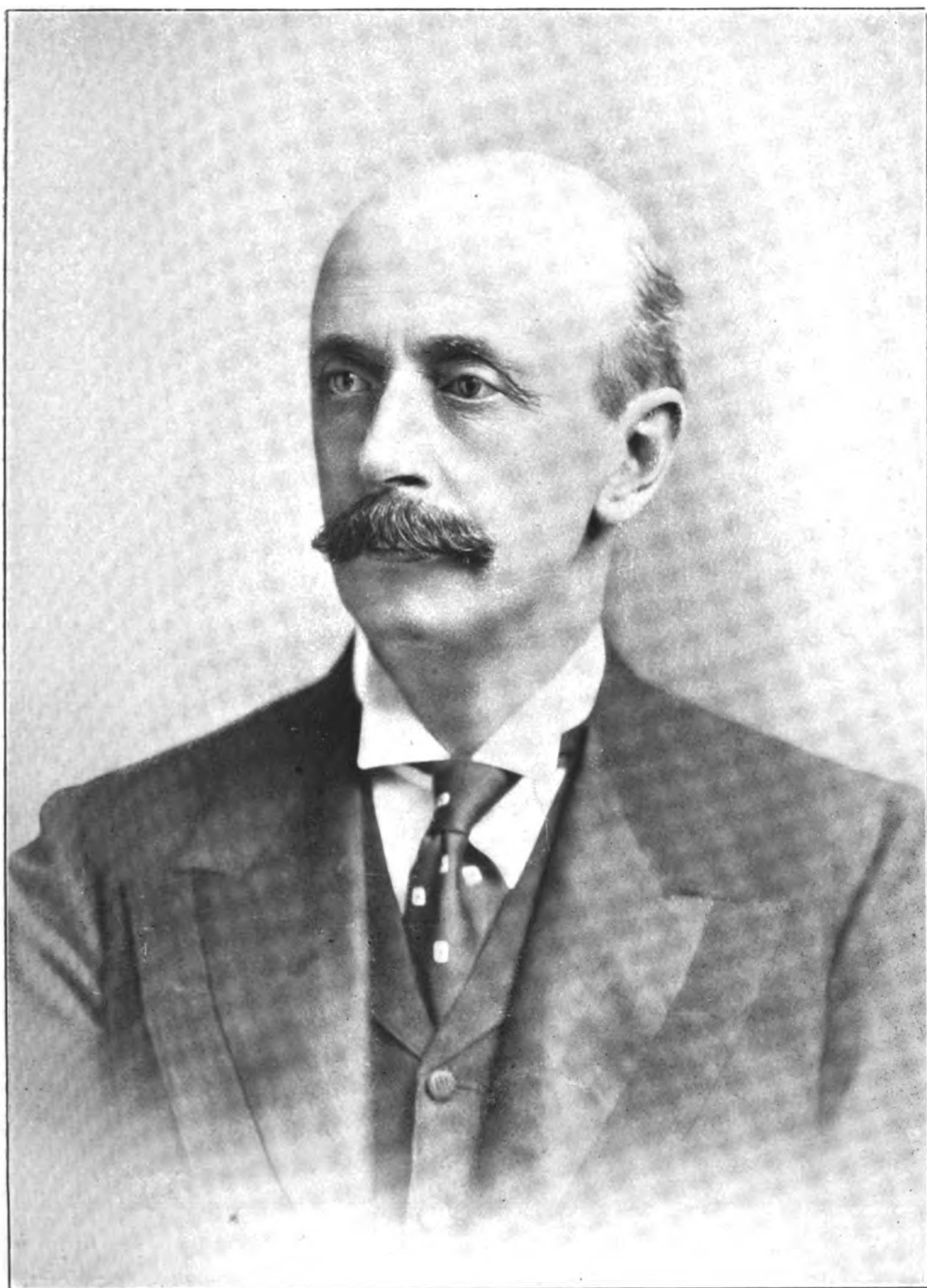
Grey, Lady Jane, English princess: b. Bradgate, Leicestershire, 1537; d. Tower Hill, London, 12 Feb. 1554. She was the daughter of Henry Grey, marquis of Dorset, afterwards duke of Suffolk. She displayed much precocity of talent; possessing an acquaintance with the classic and oriental languages, as well as French and Italian. She was married to Lord Guildford Dudley, fourth son of the Duke of Northumberland, in May 1553. Edward VI. was induced at his death 5 July 1553 to settle on her the succession to the crown. The council endeavored to keep his death secret, with a view to secure the persons of the princesses, Mary and Elizabeth. Mary apprised of their design, wrote expressing her surprise that she had not been advised of her brother's death, and commanding them on their allegiance to proclaim her title. The council replied, exhorting her to be quiet and obedient, and proclaimed Lady Jane on the 10th. On the approach of Mary the council, unsupported in their usurpation, meanly deserted their victim Lady Jane, and joined in proclaiming Mary queen on the 19th, and on the 20th Lady Jane was confined to the Tower. On 13 Nov. she and her husband were arraigned, and pleaded guilty of high treason; but they might, perhaps, have been allowed to expiate their imprudence by a temporary confinement, but for the ill-advised insurrection under Sir Thomas Wyatt, in which the Duke of Suffolk, Lady Jane's father, participated. The suppression of this rebellion was followed by their execution.

Grey Friars, a name given some of the Franciscans on account of their grey habits.

Greyhound. A long, tall, slender hound, the standard features of which are described under Dog. It hunts by sight, is fitted for the swiftest running and leaping, and is used in the sport of coursing (q.v.). In the United States greyhounds are kept mainly as pets; yet in the West are used in chase of jack-rabbits, prong-horn antelopes and coyotes. Few horses are able to keep up with them, even in a level country, and on an irregular surface they distance horses easily. The modern thin, smooth-haired type, to which the name is now popularly restricted, is a development from a form which arose in western Asia before the Christian era, and was adopted and esteemed in Syria, Egypt and Rome, during the classic period. It was taken west with the Romans in their conquest of Europe, and later became the favorite dog of the nobility, an accompaniment of falconry. At that time black, or black-and-white were the approved colors. There seems to have been little essential change of form or qualities during this prolonged history, and literature and art abound in commemoration of the dog's grace, kindness and exploits in the field. There arose at an early time a diminutive variety not half the size of its namesake (about 7 pounds in weight) fragile, delicate, and of no use save as an ornamental pet, which is now known as the Italian greyhound. It is of almost any whole color,—black, mouse-grey, fawn or rarely white. Besides these satin-coated "long-dogs," others arose in the colder parts of Europe which differed from the greyhound only in having a "rough," that is long-haired, coat. These are the Irish wolfhounds (see WOLF HOUND), the Scotch stag or deerhound (see DEER HOUND), and the Russian wolfhound or psowie (see BORZOI).

Greytown, old name SAN JUAN DE NICARAGUA, destroyed in 1854 by the United States. (For the general situation, see CLAYTON-BULWER TREATY.) In May 1854 the captain of an American steamship had a quarrel with a negro, and shot him dead; the mayor of the city ordered him arrested, and the passengers on the ship, as well as Solon Borland, the United States minister to Nicaragua, took the captain's part and resisted the arrest. The native inhabitants were indignant and mobbed Borland, whereupon the United States war-vessel Cyane, Commander Hollins, was sent to exact reparation. Hollins espoused the cause of an American transit company who were making excessive claims, and ordered the mayor to pay them at once; on their refusal he bombarded and burnt the place. This outrage embroiled the United States with Great Britain.

Gridley, Charles Vernon, American naval officer: b. Logansport, Ind., 24 Nov. 1845; d. Kobe, Japan, 5 June 1898. A graduate (1863) of the United States Naval Academy, he served during the Civil War in the West Gulf blockading squadron, subsequent to the war was on various ships, and in 1875-79 was stationed at the Naval Academy. He was navigation officer in the Boston Navy Yard in 1882-84, was lighthouse inspector in 1887-91 and 1895-97, in 1897 attained the rank of captain and was ap-



ALBERT HENRY GEORGE, THE FOURTH EARL GREY,
GOVERNOR-GENERAL OF CANADA.

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GRIDLEY — GRIEG

pointed to the command of the *Olympia*, then flagship of the Asiatic squadron. This vessel he commanded in the battle of Manila Bay 1 May (1898). He died at Kobe.

Gridley, Richard, American soldier: b. Boston, Mass., 3 Jan. 1711; d. Stoughton, Mass., 20 June 1796. He served in the British army as lieutenant-colonel of engineers under Pepperell at the capture of Louisburg in 1745; as chief engineer and colonel of infantry in 1755; took part in the expedition to Crown Point under Winslow in 1756; under Amherst in 1758; and under Wolfe at Quebec in 1759. He was appointed chief engineer and commander of the artillery of the American army upon the outbreak of the Revolution, constructed the fortifications on Breed's Hill before the battle of Bunker Hill, and later fortified Dorchester Heights. He was commissioned major-general by Congress on 20 Sept. 1775, and commanded the Continental Artillery till November of that year.

Grieg, Edvard, *ed'vård grêg*, Norwegian composer: b. Bergen 15 June 1843; d. there 4 Sept. 1907. His great-grandfather, Alexander Greig, was a Scotchman who emigrated to Norway after the battle of Culloden (1745) and changed his name to Grieg. Edward's father was British consul at Bergen; he married the Norwegian Gesine Judith Hagerup, a descendant of Kjeld Stub; from her, Edvard inherited his musical gifts; she was a good musician and gave him lessons. By the advice of Ole Bull, Edward was sent to the Leipsic Conservatory at the age of 15; he remained there three years, studying with Plaidy, Wenzel, Moscheles, E. F. Richter, Hauptmann, Reinecke. Their lessons, and the music he for the most part heard and studied, impressed a German stamp on his mind, which characterizes his first compositions. His studies were interrupted by an illness, a severe case of pleurisy, which destroyed one of his lungs and left his health impaired for life. On his return to the North he came under the influence of three Scandinavian musicians: the composer Gade, who gave him many useful hints; Ole Bull, an ardent musical patriot, who made him familiar with the charming folk-tunes of Norway, which he played so entrancingly; and Richard Nordraak, who encouraged him in his natural inclination to get out of the maelstrom of German music and steer into the fjords of Norway. From 1866 to 1873 he lived at Christiania, conducting the Philharmonic concerts and giving lessons. He also gave subscription concerts, with the aid of his cousin, Nina Hagerup, whom he married on 11 June 1867; she was an excellent vocalist, whose art was a great aid in winning favor for his songs. In 1868 Liszt accidentally came across Grieg's first violin sonata (Op. 8), and was so much impressed by the evidence of creative power it gave that he invited him to come and spend some time in his studio. It was in consequence of this flattering letter that the Norwegian Government gave Grieg a sum of money which enabled him to visit Rome. There he repeatedly met Liszt, who became more and more impressed by the boldness and the national traits of his genius; he urged him to persevere in his original course and not to let the critics intimidate him.

In 1874 Henrik Ibsen asked Grieg to write the music for a stage version of his '*Peer Gynt*.' The offer was accepted and the play was produced, with much success, in 1876. It is often given in Scandinavian cities; elsewhere it has not succeeded, because of its untheatrical, fantastic character and its grotesque local coloring; but the music, arranged for the concert hall in the form of two suites, soon made Grieg one of the most popular composers in all countries. In the same year that Ibsen invited him to compose the music for '*Peer Gynt*,' the Norwegian Government honored him with an annuity of 1600 crowns for life. This relieved him of the drudgery of teaching and enabled him to devote most of his time to composing. For several years he lived at Lofthus, on the Hardanger Fjord. At Bergen, 1880-1882, he conducted a musical society called the '*Harmonien*.' In 1885 he built the elegant villa Trolldhaugen, overlooking the fjord, about 8 kilometers from Bergen; there he lived till his death. After his fame was well established, about 1880, he left his home frequently for concert tours in Germany, France, and England. Everywhere he was acclaimed as one of the most individual and enchanting of pianists (he played only his own pieces), and usually all the seats for his concerts were sold long before their dates. Sometimes he conducted his orchestral compositions. "How he managed to inspire the band as he did and get such nervous thrilling bursts and such charming sentiment out of them I don't know," wrote Sir George Grove, in 1888. In 1893 a writer in the *Paris Figaro* said: "Among the most famous living musicians there is none I know of whose popularity equals, with us, that of M. Grieg." In 1899, Colonne invited him to Paris to conduct a Grieg concert; but it was just after the verdict in the Dreyfus case, which had made Grieg so indignant that he refused the invitation. When it was repeated, four years later, he accepted. There was a tremendous crowd; cries of "apologize, you have insulted France!" were heard; but the vast majority was with him, and the concert proved one of his biggest triumphs.

Grieg did for Norway what Chopin did for Poland, Liszt for Hungary, Dvorák for Bohemia; he created a new national art. This great achievement, unfortunately, stood in the way of the full recognition of his superlative genius. It is still commonly assumed that he did little more than transplant to his garden the wild flowers of Norwegian folk-music, whereas, in truth, ninety-five hundredths of his music is absolutely his own. He ranks with Schubert and Chopin both as a melodist and a harmonist. His persistent ill-health prevented him from writing operas and symphonies; most of his works are songs and short pianoforte pieces. The songs, 125 in number, are of striking originality and depth of feeling. The equally numerous short pieces for piano (including 66 "lyric pieces" in one vol.) are as idiomatic as Chopin's. There are also 5 sonatas: one for piano alone, three with violin, one with 'cello, beside a string quartet. The orchestral list includes: Overture, 'In the Autumn'; 'Holberg' suite; 2 '*Peer Gynt*' suites; 'Sigurd Jorsalfar'; arrangements of Grieg songs and Norwegian dances. Choral works: 'At the Cloister Gate'; 'Landsighting'; 'Olaf Trygvason.' Berg-

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liot is a poem for declamation, with orchestra. The only books on Grieg and his works are by Schjelderup, in Norwegian, and by the author of this article, in English. The latter contains a list of pamphlets and magazine articles on Grieg.

HENRY T. FINCK,

Musical Director, New York Evening Post.

Griesbach, Johann Jakob, a noted German New Testament scholar, biblical critic and theologian: b. Butzbach in Hesse-Darmstadt, 4 Jan. 1845; d. Jena, 24 March 1812. He was educated at Frankfort-on-the-Main; later studied theology at Tübingen, Halle, and Leipzig; during 1769-70 traveled extensively in England, France and Holland; in 1771 became docent and in 1773 professor extraordinary in theology at Halle; and from 1775 till his death was professor ordinary at Jena. Griesbach's most important work—to which he devoted the best years of his life—was the collecting and classifying of the ancient manuscripts and versions of the Greek text of the New Testament. His critical researches, the result of which appeared in his edition of the Greek New Testament (Halle, 1775-7) one of the first ever printed, are valuable and in the main correct. It was he who first divided the authorities for the text of the Greek New Testament into the three great families—Alexandrine, Latin or Western, and Byzantine or Eastern.

Griffin, Charles, American soldier: b. Licking County, Ohio, 1826; d. Galveston, Texas, 5 Sept. 1867. He was graduated at West Point (1847) and served through the Mexican War. In the Civil War he commanded the 5th artillery at the first battle of Bull Run, and on 6 May 1864 was brevetted lieutenant-colonel in recognition of gallant and meritorious services in the field. He was one of the commissioners to carry out the condition agreed upon by Gens. Grant and Lee.

Griffin, Gerald, Irish novelist; b. Lime-
rick, Ireland, 12 Dec. 1803; d. Cork, 12 June 1840. He will be longest remembered for his novel 'The Collegians' (1829), upon which Boucicault's popular play, 'The Colleen Bawn,' is founded. Griffin was a poet as well as a writer of tales and the author of various lyrics popular with his countrymen.

Griffin, Sir Lepel Henry, English diplomatist: b. 1840. He entered the Bengal Civil Service in 1860 and since then has been administrator of the civil government in several places, especially in the Punjab. In 1885 he was nominated by Lord Salisbury's government as Envoy Extraordinary to Peking. He has written 'The Punjab Chiefs' (1865); 'The Rajahs of the Punjab' (1870); 'The Great Republic' (1884).

Griffin, Ga., city, county-seat of Spalding County, on the Southern and the Central of G. R.R.'s. It is the centre of a cotton and fruit region, the chief fruits being grapes and peaches. The city contains cotton-mills, a foundry, and furniture factories; wine is also manufactured. The State Agricultural Experiment Station is located in the vicinity. Pop. (1910) 7,478.

Griffin, or **Gryphon**, in mythology, a fabulous animal, usually represented with the body and legs of a lion, and the head and wings of an eagle, signifying the union of strength and agility. Figures of griffins are frequently used

as ornaments in works of art. It is employed as an emblem of vigilance, the animals being supposed to be the guardians of mines and hidden treasures. Figures of it are met with in tombs and sepulchral lamps, as guarding the remains of the deceased.

Griffis, William Elliott, American clergyman and author: b. Philadelphia 17 Sept. 1843. He was graduated from Rutgers College in 1869, and 1870 went to Japan to organize schools after American methods in the province of Echizan, made a study of the Japanese feudal system, and was professor of physics in the Imperial University in 1872-74. In 1874 he returned to the United States, where he was graduated from the Union Theological Seminary in 1877. He was pastor of the First Reformed Church, Schenectady, N. Y. (1877-86), of the Shawmut Congregational Church, Boston (1886-93), and of the First Congregational Church of Ithaca, N. Y. (1893-1903). In 1891 he was a delegate to the International Congregational Council at London. From 1903 he turned his attention wholly to literary work. An authority on Japan, he also studied the Dutch origins of America and the influence of the Dutch in the formation of the United States. His published works include 'The Mikado's Empire' (1876), his best known volume, which has appeared in many subsequent editions; 'Japanese Fairy World' (1880); 'Corea: the Hermit Nation' (1882); 'Corea, Without and Within' (1884); 'Matthew Gailbraith Perry: a Typical American Naval Officer' (1887-90); 'The Lily Among Thorns' (1889); 'Honda the Samurai' (1890); 'Sir William Johnson and the Six Nations' (1891); 'Japan in History, Folklore and Art' (1892); 'Brave Little Holland' (1894); 'Townsend Harris: First American Envoy in Japan' (1895); 'The Romance of Discovery' (1897); 'The Pilgrims in their Three Homes' (1898); 'The Romance of American Colonization' (1898); 'The Romance of American Conquest' (1898); 'The American in Holland' (1899); 'The Pathfinders of the Revolution' (1900); 'In the Mikado's Service'; 'A Maker of the New Orient'; 'Sunny Memories of Three Pastorates' (1903).

Griffiths, Arthur George Frederick, English soldier and author: b. Poonah, India. He served in the Crimean War, was inspector of prisons 1878-96, edited 'The Fortnightly Review' (1884), and is editor of 'The Army and Navy Gazette.' He is the author of 'The Queen's Shilling' (1872); 'Memorials of Millbank' (1875); 'Lola: a Tale of the Rock' (1878); 'Chronicles of Newgate' (1883); 'A Prison Princess' (1890); 'Secrets of the Prison House' (1893); 'Criminals I Have Known' (1895); 'The Rome Express' (1896); 'Wellington and Waterloo'; 'Mysteries of Police and Crime' (1898); 'A Girl of Grit' (1898); 'Ford's Folley, Ltd.' (1899); 'The Brand of the Broad Arrow' (1900); 'A Set of Flats' (1901); 'A Duchess in Difficulties'; 'Tales by a Government official'; etc.

Griffon, or **Basset-griffon**, a large grayish-red field-dog, combining the qualities of both pointer and setter, but having a thick hard coat enabling it to work readily in thickets and rough country. It originated in Germany at the end of the 19th century.

GRIGGS — GRIMM

Griggs, Edward Howard, American lecturer: b. Owatonna, Minn., 9 Jan. 1868. In 1889 he was graduated from Indiana University (Bloomington), and later studied at the University of Berlin, and was successively instructor in English literature and professor of literature in Indiana University. Subsequently he became professor of ethics, and upon the combining of the departments, professor of ethics and education, in the Leland Stanford, Jr., University. From 1899 he was active as a public lecturer, particularly in connection with the courses of the Brooklyn (N. Y.) Institute of Arts and Sciences. He wrote 'Moral Education' (1905).

Griggs, John William, American politician: b. Newton, N. J., 10 July 1849. He was graduated at Lafayette College in 1868, and was admitted to the bar in 1871, practising in Paterson, N. J. He was a member of the New Jersey General Assembly, 1876-77; a state senator, 1882-88; and president of the state senate in 1886. He became governor of New Jersey 1 Jan. 1896, resigning 31 Jan. 1898 to become attorney-general in President McKinley's cabinet. He resigned in April, 1901.

Grijalva, Juan de, hoo-än' dā grē-häl'vā, Spanish navigator: b. Cuellar 1489 or 1490; d. Nicaragua, 21 Jan. 1527. He was intrusted by his uncle, Don Diego Velasquez, the first governor of Cuba, with the command of a fleet of four vessels, which, on 1 May 1518, sailed from St. Jago de Cuba, to complete the discoveries which Fernandez de Cordova had made in Yucatan the year preceding. Rounding the peninsula of Yucatan, he extended his explorations as far as the province of Panuco, giving his name and that of his companion, Alvarado, afterward famous in the expedition of Cortes, to two rivers on the coast. His communication with the Aztecs was friendly, and so profitable that he was enabled to send back one of the ships well freighted with gold, jewels, and other treasures, the acquisition of which was one of the main objects of the expedition. On his return to Cuba he found an expedition organizing for the conquest of Mexico, with Cortes at the head, and was received by Velasquez with reproaches for having neglected to plant colonies on the coast. Grijalva, a man of integrity and prudence, had, however, acted strictly in conformity with his instructions, and against his own judgment. In the latter part of his life he settled in Nicaragua, and was slain in an outbreak of the Indians in the valley of Ulancho.

Grillparzer, Franz, fränts gril'pärt-sēr, German poet and dramatist: b. Vienna 15 Jan. 1791; d. there 21 Jan. 1872. In 1813 he entered the service of the imperial court, retiring to private life with the title of Hofarth (court councillor), in 1856. In 1861 he was appointed member for life of the imperial council. He became known as a dramatist in 1816 by his 'Ahnfrau,' a tragedy of the fatalistic school, which still keeps the stage. It was followed by the dramas 'Sappho' (1819); 'Das Goldene Vlies' (1822); 'Des Meeres und der Liebe Wellen' (1840), an adaptation of the legend of Hero and Leander. Perhaps the finest of Grillparzer's products is the historical drama of 'König Ottokar's Glück und Ende' (1825).

Grilse, a young salmon (q.v.).

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Grimes, James Wilson, American politician and legislator: b. Deering, Hillsboro County, N. H., 20 Oct. 1816; d. Burlington, Ia., 7 Feb. 1872. He was graduated at Dartmouth College (1836), and went west, where he began the practice of the law, was appointed secretary of a commission instituted to negotiate the transfer of lands from the Sac and Fox Indians, and after the organization of Iowa Territory in 1838, he was elected to its legislature. He was elected governor of Iowa in 1854, and after completing his term, was sent to Congress as a Republican Senator. He voted for the acquittal of President Johnson at his impeachment trial.

Grimké, grím'kē, Archibald Henry, American lawyer: b. Charleston, S. C., 17 Aug. 1849. He was graduated from Lincoln University in 1870, from the Harvard Law School in 1874, and in 1883-85 was editor of the 'Hub,' a Boston newspaper. In 1891-92 he was a special writer for the Boston *Herald* and *Traveller*, and in 1894-98 United States consul at Santo Domingo. His writings include a 'Life of William Lloyd Garrison' (1891), a 'Life of Charles Sumner' (1892), and numerous contributions in periodicals, dealing chiefly with various questions pertaining to the American negro.

Grimké, Thomas Smith, American lawyer and scholar: b. Charleston, S. C., 26 Sept. 1786; d. near Columbus, Ohio, 12 Oct. 1834. He was graduated at Yale College in 1807, studied law at Charleston and rose to eminence at the bar and in the politics of his State. He became widely known by his addresses in behalf of peace, religion, and literature. An early and prominent advocate of the American Peace Society, he held the opinion that even defensive warfare is wicked. Though a superior classical scholar, he maintained that neither the classics nor mathematics should enter into any scheme of general education in this country. In some of his pamphlets he introduced a new system of orthography of the English language. A volume of his addresses was published at New Haven in 1831.

Grimké Sisters, The, SARAH MOORE, and ANGELINA EMILY: b. Charleston, S. C., 1792 and 1805; d. Hyde Park, near Boston, 1873 and 1879. They were sisters of Thomas Smith Grimké (q.v.). They liberated their slaves, removed to Philadelphia, entered the Society of Friends, and became known in connection with the Anti-slavery movement. They went to New York in 1836 and in the year following to Boston; were leaders in the American Anti-Slavery Society, and appeared as platform speakers on slavery. In 1854 they established a successful coeducational academy at Bagleswood (near Perth Amboy), N. J. Sarah lectured also on woman's rights. Angelina wrote 'An Appeal to the Christian Women of the South'; Sarah an 'Epistle to the Clergy of the Southern States.'

Grimm, Jakob Ludwig, yā'kōb lood'vīg grīm, German philologist: b. Hanau, Hesse-Cassel, 4 Jan. 1785; d. Berlin, 20 Sept. 1863. In 1806 he became librarian to Jerome Bonaparte, king of Westphalia, and from 1816 to 1829 occupied the post of second librarian at Cassel. From 1830 to 1837 he resided at Göttingen as professor and librarian, lecturing on the German language, literature and legal antiquities. Hay-

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ing, with six other professors, resisted the unconstitutional encroachments of the King of Hanover, he was banished, and after his retirement to Cassel, he was, in 1841, called to Berlin as a professor and member of the Academy of Sciences. He sat in the National Assembly of 1848, and in that of Gotha in 1849. From that time till his death, he occupied himself only with his various publications. He wrote on German mythology, German legal antiquities, the history of the German language, and published old German poems, etc. His two greatest works, both unfinished, are his 'Deutsche Grammatik' (1819-37), and his 'Deutsches Wörterbuch' commenced in 1852, in conjunction with his brother Wilhelm (q.v.), and gradually completed by eminent scholars. He also published, in company with his brother, the 'Kinder und Hausmärchen,' one of the most popular collections of juvenile fairy tales.

Grimm, Wilhelm Karl, vil'hēlm kārī, German philologist: b. Hanau, 24 Feb. 1786; d. Cassel, 16 Dec. 1859. He was the companion in study of his brother, Jakob Grimm (q.v.), at the Lyceum of Cassel, the University of Marburg, and again at Göttingen, where in 1830 he was appointed under-librarian and supernumerary professor of philosophy. He joined his brother in the protest against the King of Hanover, shared his exile, and also his call to Berlin. There they labored together, and were commonly known as the Brothers Grimm. Under that name also they have a certain immortality in the affections of the civilized world. His earliest independent work was a German translation of the Danish 'Kømpe-Viser' (1811-13). He edited many old German texts and collaborated with his brother Jakob in several of his works. His own most important book is 'Die deutsche Heldensage' (1867), and 'Kleinere Schriften,' (1881-86).

Grimm's Law is the name given to the rule which regulates the *Lautverschiebung*, or permutation of certain primitive consonants, which takes place in the Teutonic languages. The law, as finally formulated by Jakob Grimm, is that if the same roots or words exist in Sanskrit, Greek, and generally in Latin, Celtic, Lettic, and Slavonic, and also in Gothic, English, Dutch, and other Low German dialects on the one hand, and in Old High German on the other, the following correspondences are to be expected: (1) Gothic has a soft mute, and High German a hard mute, in place of the corresponding aspirate in Sanskrit and Greek; (2) Gothic has a hard mute, and High German an aspirate, in place of the corresponding soft mute in Sanskrit and Greek; (3) Gothic has an aspirate, and High German a soft mute, in place of the corresponding hard mute in Sanskrit and Greek. Thus, a primitive *th* becomes *d* in Low German, and *t* in High German, as in the words *thugater*, daughter, *tochter*. A primitive *d* becomes *t* in Low German, and *s* in High German, as in *duo*, two, *swei*; or *dens*, tooth, *zahn*; or *decem*, ten, *zehn*. A primitive *t* becomes *th* in Low German, and *d* in High German, as in *tres*, three, *drei*; or *tu*, thou, *du*; or *tenuis*, thin, *dünn*. Similar changes affect the labials and gutturals, as in *pecus*, *fee*, *vieh*; *pater*, father, *vater*; *fagus*, beech, *puocha*; and in *oculus*, *eghe* ("eye"), *auge*; *quis*, *who*, *wer*; or *khortos*,

garden, *horto*. The normal changes are set forth in the following table:

	Labials			Dentals			Gutturals		
Greek, etc.....	p	b	ph	t	d	th	k	g	kh
Gothic, etc.....	f	p	b	th	t	d	(h)	k	g
Old High German..	(v)f	p		d	z	t	g(b)	ch	k

The credit of the discovery of the *Lautverschiebung* is not wholly due to Jakob Grimm. Ihre and Rask had discovered, as early as 1818, the law of the transmutation of consonants in Greek and Gothic, while Grimm, in the second edition of his 'Deutsche Grammatik'; which appeared in 1822, added the corresponding changes in Old High German, and formulated the law as it now stands.

Grimm's Law may be interfered with by the action of other laws, especially by the position of the accent, as formulated in Verner's Law (q.v.). Thus *fráter* is accented on the first syllable and *patér* on the second, consequently, though we have *brother* and *father* in English, we find *bruder* and *vater* in High German. The accent in *patér* has interfered with the regular action of the *Lautverschiebung*, and prevented the normal change of *t* to *d* from taking place.

Thus Grimm's Law may be defined as the statement of certain phonetic facts which happen invariably unless they are interfered with by other facts. The great use of Grimm's Law, in addition to the identification of words in different languages, is in the detection of loan words. Any etymology which violates Grimm's Law, as qualified by other phonetic laws, must be rejected unless it can be explained as a loan word.

The causes which brought about the changes formulated in Grimm's Law are obscure. They are probably due to the settlement of Low German conquerors in central and southern Germany.

See Douse, 'Grimm's Law: a Study of Lautverschiebung' (1876), Max Müller, 'Lectures on the Study of Language,' 2d series, lecture v. (1864), Morris, 'Historical Outlines of English Accidence,' chap. ii. (1872).

Grimmel (grím'zēl) Pass, a mountain pass in the Bernese Alps, leading from Meiringen, canton of Bern, to Obergesteln, canton of Valais. It was in this pass that the French repulsed the Austrians in 1799.

Grimshaw, Robert, American engineer: b. Philadelphia, Pa., 25 Jan. 1850. He is lecturer in the Franklin Institute of his native city and has done much literary work. He has published: 'Saws' (1880); 'Steam-Engine Catechism' (1887); 'Records of Scientific Progress' (1891); 'Hints to Power Users' (1891); 'Fifty Years Hence' (1892).

Grimthorpe, Edmund Beckett Denison, LORD, English barrister and author: b. Carlton Hall, Nottinghamshire, England, 12 May 1816; d. 29 April 1905. He took much interest in architecture, and designed many churches and houses, but he will be longest remembered for his restorations and rebuildings at St. Albans Cathedral, works which were carried out at his own expense, but from their iconoclastic character met with almost universal disapproval from architects and excited much discussion both in England and America. His works include: 'Origin of the Laws of Nature' (1879); 'A Book on Building' (2d ed. 1880); 'Should the Revised New Testament be Authorized?'

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(1882); 'Astronomy Without Mathematics' (7th ed. 1883); 'Treatise on Clocks, Watches, and Bells' (7th ed. 1883).

Grinding, a mechanical process in which certain effects are produced by the attrition of two surfaces. This process is of extensive use in various mechanical arts, as in grinding corn, ores, colors, in which cases the object is to reduce the materials by crushing to a fine powder; or in grinding the metals, glass, and other hard substances for the purpose of giving them a certain figure or polish, or a sharp cutting edge. In the first case the grinding or crushing is effected by passing the material between rough stones, as in the common flour-mill, or as in crushing ores between heavy metal cylinders, smooth or fluted, according to the degree of fineness required, or by a heavy stone or iron cylinder revolving upon a smooth plate. Chicory, chocolate, plumbago for pencils, and a variety of other substances are ground by iron or stone rollers, revolving on a slab in such a manner that they not only merely roll but also rub on the surface of the slab. A knife or scraper follows one roller and precedes the other, scooping the paste into the position required to come fairly under the roller which follows it. Colors are ground in small quantities with a muller and slab. The muller is a heavy piece of stone of conical shape, and which rests its base on the slab and is grasped by the hands; the color is mixed to a pasty consistence with the desired medium of oil or water, and rubbed between the two surfaces until smooth and impalpable. The grinding of cutlery and tools is effected by means of the grindstone; glass lenses and metal specula are ground to shape with emery-powder laid on a metal tool. Ornamental glass is ground into facets or otherwise by means of stones and lap-wheels. Diamonds and other precious stones are cut or ground with diamond dust embedded in soft iron. Large flat surfaces are obtained by first working two pieces of the material nearly flat and then laying the one upon the other and grinding their surfaces together with sand, emery, or other cutting powder. Plate-glass is flattened in this way; also surfaces of cast-iron, where accurate fitting is required. Sockets and other bearings which require to be fitted with great nicety are usually finished by being ground together. For brass or bell-metal pumice-stone is employed in such cases, as emery is apt to embed itself in the metal and give it a permanent abrading action on the bearings. Dry grinding is the term applied to the grinding of steel with dry grindstones. The points of needles and forks are produced by this means, also the finishing of steel pens and the surface of gun barrels. The men and women engaged on this kind of work suffer painfully from irritation of the throat and nostrils caused by the fine, dust-like particles that fly off from the work. These difficulties have been mitigated in recent years by the use of mouth-pieces of damp cloth, and the provision of air-blasts to dispose of the dust. Sand-jet grinding is a remarkable process, in which abrasion is effected by the percussion of small hard particles on a plain surface. Sharp silicious sand, varying in hardness and fineness according to the kind of work to be done, is employed in most cases. This sand is impelled by a blast of steam or of air. A hole $1\frac{1}{2}$ inch in diameter by $1\frac{1}{2}$ deep, has been bored through a solid piece of corundum (the hardest mineral

known except the diamond) in 25 minutes by sand driven with steam-power at 300 pounds pressure on the square inch. A diamond has been sensibly reduced in weight, and a topaz altogether dissipated by a sand-jet in one minute. These results are obtained by causing a sand-stream to mix with a steam jet. The sand passes through a central tube, and the steam through an annular tube which surrounds it; a kind of suction acts at the end of the concentric tubes, which draws the sand into the steam jet, and both dash with great force against the stone or other substance to be acted upon, which is placed at about an inch from the mouth of the tube. By the use of flexible jointed connecting tubes the jet can be turned in any direction, and grooves, moldings, letters, etc., can be produced instead of merely straight cuts or cavities. By using an air jet instead of steam, and varying the pressure, a design can be engraved on glass, the parts not to be acted upon being covered with the pattern, made of paper, lace, india-rubber, or oil-paint.

Grindstone Island. (1) A small island lying off the southeastern coast of New Brunswick, Canada, at the head of the Bay of Fundy. It has a number of sandstone quarries, from which a fine quality of sandstone is exported, chiefly to the United States, for the manufacture of grindstones. (2) One of the most important of the Magdalen Islands, belonging to Quebec, in the gulf of St. Lawrence, northeast of New Brunswick.

Grinnell, grĭn-ĕl', George Bird, American writer and ornithologist: b. Brooklyn, N. Y., 20 Sept. 1849. He has been an editor of 'Forest and Stream' from 1876. His works deal principally with Indian life and folklore and among them are: 'Pawnee Hero Stories and Folk Tales' (1889); 'The Story of a Prairie People'; 'The Story of the Indian' (1895); 'The Indians of To-day' (1900); 'Jack Among the Indians' (1900).

Grinnell, Henry, American patron of arctic exploration: b. New Bedford, Mass., 1799; d. New York, 30 June 1874. In 1828 he settled in New York and amassed a fortune in business as a ship-owner. This gave him an opportunity to fit out at his own expense the ship which in 1850 sailed from New York in search of Franklin. He also bore a large part of the expense of Kane's arctic voyage (1853-55), as well as of the later American expedition under the command of Hayes and Hall. In recognition of his services to geographical science the American Geographical Society elected him their president and the coast which stretches to the north of Smith Sound was named Grinnell Land.

Grinnell, Josiah Bushnell, American clergyman and politician: b. New Haven, Vt., 22 Dec. 1821; d. Marshalltown, Iowa, 31 March 1891. After studying at Auburn Theological Seminary, he entered the Presbyterian ministry and held pastorates successively at Union Village, N. Y., Washington, D. C., and New York. In 1854 he founded the Congregational Church in Grinnell, Iowa, a town named for him, and preached there several years. Later he became known as a wool grower, sat in the Iowa senate 1856-60, and in Congress as a Republican 1863-67. He frequently aided fugitive slaves and at one time a reward was offered for his head on this account by slave-holders. He gave

much assistance to Grinnell University, of which he was president, and laid out five Iowa towns. He was the author of 'The Home of the Badgers' (1845); 'Cattle Industries of the United States' (1884).

Grinnell, Iowa, city in Poweshiek County; on the Chicago, R. I. & P., and the Iowa C. R.R.'s; 115 miles west by north of Davenport. It is the principal trade centre for the county, and manufactures flour, carriages, gloves, and some farming implements. It is the seat of the Iowa College, founded in 1848 and under the auspices of the Congregational Church. In 1882 the city was nearly swept away by a cyclone. Pop. (1910) 5,036.

Grinnell Land, a large tract of land in the Arctic Ocean, separated from Greenland by Kennedy and Robeson channels. The northern part of the explored portion is called Grant Land and the southern part Ellesmere Land. The coast is irregular, and the interior is hilly. The climate of the valleys is mild in summer; in many places there is no snow for several weeks, and vegetation grows rapidly. The fox, wolf, musk-ox, ermine, and hare are found in quite large numbers. Lieut. De Haven, an American, in charge of the Grinnell expedition in search of Sir John Franklin, first saw this land 22 Sept. 1850 and named it after Henry Grinnell (q.v.). Eight months later it was visited by Capt. Penny of the British vessel, *Lady Franklin*. He not knowing of the previous visit called the country Prince Albert Land. A British expedition under Nares visited it 25 years after De Haven, Greely in 1881, Lockwood in 1882, and Peary in 1898-99.

Gripe. (1) A brake applied to the wheel of a crane or derrick; it generally consists of an iron hoop under the control of a lever, and is drawn closely around the wheel to check its motion. (2) As a nautical term: (a) The fore-foot of a ship, on to which the stem is fastened; the forward end of the keel. It is scarfed to the stem piece and false keel, and is secured by a horseshoe or ring to the stem. (b) A broad plait of rope or bars of iron, with lanyard rings and claws, passing over a large boat, and by which it is secured to the ring bolts of the deck. (c) One of a pair of bands passing round a boat near the stem and stern when suspended from the davits, to prevent the boat from swinging about.

Grippe. See INFLUENZA.

Griqualand (grē'kwa-länd) **East**, a district of Cape Colony, Africa, lying south of Natal, between Pondoland and Basutoland; area, 7,594 square miles. The capital is Kokstad. Pop. about 153,000.

Griqualand West, a district of Cape Colony, Africa, bounded north by Bechuanaland, east by the Orange River colony, south by Orange River, and west by Orange River and Bechuanaland; area, 15,197 square miles. It is noted for its diamond fields which in 1870 began to attract people from other countries. The country was then claimed by the Orange Free State and by Waterboer, the Griqua chief. In 1871 Waterboer ceded all his rights to the British government, and in 1876 the Orange Free State relinquished all claim for the sum of about \$440,000. In 1880 Griqualand West was incorporated as a part of Cape Colony. The chief

centre of the diamond mining industry is Kimberley (q.v.), the capital. Pop. about 85,000. Consult: 'Statesman's Year Book'; Reports (British) 'On the Cape and Griqualand West Diamond Mining'; Reunert, 'Diamonds and Gold in South Africa'; Williams, 'The Diamond Mines of South Africa' (1902).

Gris'com, John, American educator: b. Hancock's Bridge, Salem County, N. J., 27 Sept. 1774; d. Burlington, N. J., 26 Feb. 1852. After pursuing his studies at the Friends' Academy in Philadelphia, established by William Penn, he took charge of the Friends' monthly meeting school in Burlington, with which he was connected 13 years. In 1807 he removed to New York, and began there a career of 25 years as a teacher. In connection with his school he lectured on chemistry with much success. He took a prominent part in the formation of the society for the prevention of pauperism (1817), of which he prepared the constitution and an elaborate first report on the causes and remedies of pauperism. He was an organizer of the Rutgers Medical College, in which he occupied the chair of chemistry and natural philosophy, and after the suspension of the college was widely known as a general lecturer on those subjects. Horace Mann quoted him as one of the eight educational authorities for the changes which Mann planned to introduce into the Massachusetts school system.

Grisons, grē-zōn (German, *Graubünden* or *Bünden*), the largest canton of Switzerland; area, about 2,773 square miles. It is a mountainous country, more than 20 peaks being above 9,000 feet. The valleys are generally narrow, Upper and Lower Engadine are the broadest. Its chief drainage streams are the Inn, branches of the Adige and the Adda, and the Vorder and the Hinter Rhine which have their rise in this canton, and which belong to the Rhine basin. There are a large number of small lakes. Snow rests on the mountains until the last of May and sometimes into late July, but the climate of the valleys is warm or temperate nearly all the year. Agriculture in the valleys and the raising of cattle and sheep on the mountain sides are the chief occupations.

Griswold, griz'wöld, **Alexander Viets**, American Protestant Episcopal bishop: b. Simsbury, Hartford County, Conn., 22 April 1766; d. Boston, Mass., 15 Feb. 1843. After studying for the ministry he was ordained in 1795. He was rector of St. Michael's Church, Bristol, R. I., 1804-30 and of St. Peter's, Salem, Mass., 1830-35. When what was known as the eastern diocese of the Episcopal Church was organized he was consecrated its first bishop in 1811. He published 'The Reformation and the Apostolic Office' (1843). See Stone, 'Memoirs of Bishop Griswold' (1844).

Griswold, John Augustus, American manufacturer: b. Nassau, Rensselaer County, N. Y., 1822; d. 1872. At Troy, N. Y., he was active successively in the hardware, drug, and iron trades, and established the Albany and Rensselaer Iron and Steel Company. He was a leader in the introduction of Bessemer steel manufacture into the United States, and with C. H. Delamater built the Monitor of Civil War fame. In 1855 he was elected mayor of Troy, in 1863 a Democratic representative in Congress, and sub-

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sequently was twice re-elected as a Republican. In 1868 he was nominated for the governorship of New York, but defeated by the Democratic nominee, J. T. Hoffman.

Griswold, Matthew, American jurist: b. Lyme, Conn., 25 March 1714; d. there 28 April 1799. Besides being lieutenant-governor of Connecticut 1771-84, he was governor 1784-85 and became judge of the supreme court in 1769. He also presided over the convention which ratified the Federal Constitution.

Griswold, Roger, American politician: b. Lyme, Conn., 21 May 1762; d. Norwich, Conn., 25 Oct. 1812. He was graduated from Yale College in 1780, and afterward studied and entered on the practice of law. He was a member of Congress, 1795-1805, and became judge of the Connecticut supreme court in 1807. He was lieutenant-governor of his native State, 1809-11, and governor 1811-13. He was a son of Matthew Griswold (q.v.).

Griswold, Rufus Wilmot, American author and compiler: b. Benson, Rutland County, Vt., 15 Feb. 1815; d. in New York, 27 Aug. 1857. He was apprenticed to the printing trade, but afterward studied divinity and became a preacher in the Baptist Church. He soon became associated in the editorship of literary periodicals in Boston, New York, and Philadelphia, among which were the 'New Yorker,' 'Brother Jonathan,' and the 'New World.' In 1842-43 he edited 'Graham's Magazine,' in Philadelphia, to which he attracted contributions from some of the best writers in the country, and in 1850 projected the 'International Magazine,' published in New York, and edited by him till April, 1852. The works by which he is chiefly known are collections of specimens from American authors, accompanied by memoirs and critical remarks. His published works include: 'Poets and Poetry of America' (1842); 'Prose Writers of America' (1846); 'Female Poets of America' (1849); 'Sacred Poets of England and America' (1849); 'Poets and Poetry of England in the Nineteenth Century' (4th ed. 1854); 'Curiosities of American Literature,' 'Washington and the Generals of the American Revolution,' with Simms, Ingraham, and others (1847), 'Napoleon and the Marshals of the Empire,' with Wallace (1847); 'Republican Court, or American Society in the Days of Washington' (1854). He edited the first American edition of the prose works of Milton (1845), and was one of the editors of the works of Edgar A. Poe, for whose bad repute Griswold's 'Memoir' is partly responsible.

Griswoldville, Battle of. When General Sherman marched from Atlanta to the sea, his right wing, commanded by Gen. Howard, was under instructions to threaten Macon and strike the Savannah Railroad at Gordon, about 20 miles east. Upon his arrival at Clinton, the cavalry advance made a demonstration on Macon, and 21 Nov. 1864, his entire cavalry force took up an advanced position covering all the roads to Macon, and that day and the next all the troops and trains were closed up toward Gordon, except C. R. Woods' division, which was directed to take up a strong position on the Irwinton road and demonstrate on Macon and Griswoldville, eight miles east. The demonstration was made on the 22d by Walcutt's

brigade of 1,513 men and two guns, in cooperation with Kilpatrick's cavalry on the different roads. Some of Kilpatrick's cavalry were in advance of Walcutt and were fiercely attacked by Wheeler; but with Walcutt's assistance Wheeler was driven from the field, and followed by Walcutt beyond Griswoldville. Walcutt was then recalled to a position a little east of Griswoldville, where two miles in advance of his division, he formed line along a slight rise of ground, with his flanks well protected by swampy ground, and with an open field in front. Kilpatrick's cavalry was on either flank. Walcutt had scarcely thrown up a rail barricade, in view of another attack of Wheeler's cavalry, when he was fiercely assailed by infantry. That morning, under Gen. Hardee's order, Gen. G. W. Smith, in command of a considerable body of Georgia militia that had been concentrated at Macon, directed Gen. Phillips, with a division of infantry and a battery, to march from Macon to Gordon and take trains for Augusta. Phillips had been instructed to halt before reaching Griswoldville and wait for further orders, and was cautioned not to engage an enemy if met, but to fall back to the fortifications at Macon. But when he heard of Walcutt's position he moved through Griswoldville and, with more courage than discretion, threw his four brigades against Walcutt, at the same time opening destructively with his artillery. At 2 o'clock, in three compact lines, his militia charged to within 75 yards of Walcutt's line, and were repulsed. The assaults were repeated in front and on both flanks, and continued until sunset, when, everywhere repulsed, he abandoned the field, leaving his dead and wounded. During the action Walcutt was severely wounded by a piece of shell. The Union loss was 13 killed, 69 wounded, and 2 missing. The Confederate loss was 51 killed and 472 wounded. Consult: 'Official Records,' Vol. XLIV.; Cox, 'The March to the Sea'; the Century Company's 'Battles and Leaders of the Civil War,' Vol. IV.

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Griv'et. See GREEN MONKEYS.

Groesbeck, groos'bēk, **William Slocomb**, American politician: b. New York, 1815; d. 1897. He was graduated from Miami University, Oxford, Ohio, in 1835, studied law and began practice at Cincinnati. In 1851 he was a member of the Ohio State constitutional convention, and in 1852 a member of the commission appointed for the codification of the State laws. From 1857 to 1859 he was a Democratic representative in Congress, in 1872 was nominated for the Presidency by the Liberal Republicans but met no recognition in the ensuing campaign, and in 1878 was United States delegate to the International Monetary Congress at Paris. He defended Andrew Johnson in the latter's impeachment trial (1868).

Groin, the region where the front of the thigh joins the body. The abdominal muscles end below in a strong tendon which makes a fold across the front of the bony pelvis. The large nerves, arteries, and veins pass through folds of this ligament, and portions of the abdominal contents in case of rupture pass into the scrotum or form a tumorous swelling in the groin.

Gronlund, grōn'lūd, Lawrence, American socialist: b. in Denmark 1847; d. 1899. He studied in the University of Copenhagen, in 1867 came to the United States, practiced law for a time, but became a writer and speaker on socialism. Among his publications are 'The Coming Revolution' (1880), a forecast of the peaceful changes which he believed might be effected by a national organization operating in every community; 'Ça Ira,' a rehabilitation of Danton (1888); and 'The New Economy' (1898).

Gronovius, grō-nō'vī-ūs (properly GRONOV, grō'nōv), the name of several Dutch classical scholars:

(1) JOHANN FRIEDRICH, yō'hān frēd'rih: b. Hamburg 8 Sept. 1611; d. Leyden, 28 Dec. 1671. He studied at Leipsic and Jena, and law at Altdorf, was appointed professor of history and eloquence at Deventer (1642), and, after the death of Heinius, succeeded him as professor of belles-lettres at Leyden (1658). His editions of Livy, Statius, Justin, Tacitus, Aulus Gellius, Phædrus, Seneca, Sallust, Cicero, Terence, Pliny, and Plautus, 'Observationes' (1639), and edition of Hugo Grotius' work, 'De Jure Belli et Pacis' (1642) are justly valued on account of the notes.

(2) JAKOB, yā'kōb, son of the preceding: b. Deventer, 1645; d. Leyden, 21 Oct. 1716. He studied at Deventer and Leyden, and published, in 1676, an edition of Polybius, which met with great applause. He received from the grand duke of Tuscany a professorship at Pisa, which he relinquished in 1679 to become professor of Greek literature and history at Leyden. This learned critic edited Tacitus, Polybius, Herodotus, Pomponius Mela, Cicero, Ammianus Marcellinus and other classical writers, and compiled the valuable 'Thesaurus Antiquitatum Græcarum' (1698-1702). He also promoted the publication of the collections of Grævius. He was a violent controversialist.

Groot, grōt, Groete, or Groote, Gerhard or Gerardus, founder of the Brothers of the Common Life (q.v.): b. Deventer 1340; d. there 20 Aug. 1384. Educated at Paris, he there became a teacher, later took deacon's orders and was successful as a traveling preacher. He advocated general reading of the Scriptures, assembled a company for the preparation of copies of the Bible, and thus began the formation of the Brothers of the Common Life. To this order, which obtained papal sanction in 1418, belonged Thomas à Kempis (q.v.). Groot was the author of several works.

Gros, Antoine-Jean, an-twān zhōn grō, BARON, French historical painter: b. Paris 16 March 1771; d. near Paris, 26 June 1835. At 14 he became a pupil of David, and in 1794 left Paris for Rome. His means, however, were not sufficient for the journey, and he had to depend on what he could earn as a portrait-painter in the various towns he passed through. At Genoa, in 1796, he was drawn for the French army, and soon became a staff-officer. Josephine, afterward empress of France, saw and admired several portraits by the young officer, and he was called upon to paint that of Bonaparte. The result was a picture representing Napoleon leading his troops over the bridge of Arcola. In 1804 he produced his 'Peste de Jaffa,' considered by many to be his masterpiece. He painted the

'Bataille d'Aboukir' (1806); 'Bataille d'Eylau' (1808); 'La Prise de Madrid,' 'Wagram,' and 'La Bataille des Pyramides' (1810). In France his chief work is considered by some to be the cupola of St. Geneviève at Paris, exhibiting the saint protecting the throne of France, represented by Clovis, Charlemagne, St. Louis, and Louis XVIII. This picture covers an immense space, and is correct in design but defective in color and expression. The artist received for it 100,000 francs and the title of baron. The rise of the romantic school bore away from him the tide of popularity, and his last work 'Hercule et Diomède,' was a failure. Adverse criticisms upon it brought on a fit of despondency and he drowned himself in the Seine.

Gros Ventres, grō vāntr (Fr. "big bellies").

(1) The Minnetari or Hidatsa Indians, on the Missouri River. (2) A band of the Arapaho, who separated from the main body about 1800: the name was a misunderstanding of their own term, which meant "hungry men" or "beggars." After conflicts with the Sioux, and being plundered by the Crows, whom they had joined, they settled among the Blackfeet near Milk River about 1824; prospered, and were very hostile to the whites. About 1830 they had some 400 lodges and 3,000 souls. But about 1866 they were decimated by the measles, and thus weakened, received a terrible defeat from the Pie-gans; reduced to about 1,300 by smallpox in 1870, they were plundered and many killed by the Sioux. Later they were joined by the main body of Arapaho and Cheyennes. In 1868 they were settled among the Blackfeet in Montana.

Grosbeak, grōs'bēk, any of various birds whose beaks seem disproportionately large. They are mainly finches such as the hawfinch and bullfinch in Europe, and their relatives in the Orient. Bird-dealers call "grosbeaks" a great number of African, Asiatic and American line cage-birds, some of which are weaver-birds, or tanagers, etc. The term is more exactly given to certain North American fringilline birds with big swollen bills, such as the cardinal (q.v.), the evening grosbeak (q.v.), and the pine, blue, rose-breasted, and black-headed grosbeaks. The pine grosbeak (*Pinicola enucleator*) is a greenish yellow finch which dwells exclusively in the coniferous forests of northern Europe and America, and is only seen in the United States when forced southward by hard winters; it feeds on the seeds of the pine, spruce, etc., wrenching open the cones with its powerful beak. The blue grosbeak (*Guiraca carulea*) is a large, richly blue southern and western bird, nearly related to the indigo-finch, which makes its nest in a bush, and lays pale blue eggs, wholly unmarked. The rose-breasted and black-headed grosbeaks represent the genus *Zamelodia*, the former (*Z. ludoviciana*) in the Eastern States, and the latter (*Z. melanocephala*) in the Rocky Mountain region. Both are birds of brushy places, making large, rude nests in bushes and laying greenish, heavily marked eggs; and in the breeding-season both are among the loudest and most brilliant of American song-birds. As in nearly all the grosbeaks the females of these species are inconspicuous in brown tints, while the males are dressed in gay colors. The male rose-breasted has the head, neck and upper parts mostly black, with the rump, wings, tail and abdomen, white; while the breast and lining of

the bend of the wing are exquisite rose-red, which the bird is fond of displaying. The male black-head has a wholly black head and upper parts, set off by a collar and other marks of dull orange, which color also suffuses the whole lower parts.

Grose, grös, William, American soldier and politician: b. Dayton, Ohio, 1812; d. 1900. He resigned his position as judge of the court of common pleas in 1861 to recruit and take command of the 36th Indiana regiment of infantry, and commanded a brigade in the battles of Murfreesboro, Chickamauga, and Chattanooga. He was commissioned brigadier-general 30 July 1864 and at the battle of Nashville, 15 and 16 Dec. 1864, he commanded the Third brigade in General Thomas's army. In 1865 he was brevetted major-general of volunteers. He was State senator from 1879 to 1883.

Gross, grös, Charles, American historian: b. Troy, N. Y., 10 Feb. 1857. After graduating from Williams College in 1878, he pursued his studies at Göttingen, and was engaged in literary work in England 1884-87. Since 1888 he has been instructor and professor of history at Harvard University. A frequent contributor to the 'American Historical Review' and other historical journals, he has published: 'Gilda Mercatoria' (1883); 'The Exchequer of the Jews of England in the Middle Ages' (1887); 'The Gild Merchant' (1890); 'Select Cases from the Coroner's Rolls' (1896); 'Bibliography of British Municipal History' (1897); 'Sources and Literature of English History' (1900). In addition he has translated: Lavis's 'Political History of Europe' (1891); Kayserling's 'Christopher Columbus' (1893).

Gross, Samuel D., American physician and surgeon: b. Northampton County, Pa., 8 July 1805; d. 6 May 1884. He began the practice of medicine in Philadelphia, devoting his leisure to study and to the translation of French and German medical works. His first original work was a treatise on the 'Diseases and Injuries of the Bones and Joints' (1830), in which occurs the first account of the use of adhesive plaster as a means of extension in the treatment of fractures. In 1835 he became professor of pathological anatomy in the medical department of the Cincinnati college, where he delivered the first systematic course of lectures on morbid anatomy that had ever been given in this country, and composed the first systematic treatise upon the subject ever published in the United States, 'Elements of Pathological Anatomy' (1839). In 1840 he became professor of surgery in the University of Louisville. Besides the works already mentioned, he was the author of a monograph on 'Wounds of the Intestines' (1843); 'Diseases, Injuries, and Malformations of the Urinary Organs' (1851); 'Foreign Bodies in the Air Passages' (1854); 'System of Surgery, Pathological, Diagnostic, Therapeutic, and Operative' (2 vols. 1859).

Grosse, Julius Waldemar, German poet, dramatist, and novelist: b. Erfurt, Prussia, 25 April, 1828; d. 1902. After obtaining his education at Halle, he entered the field of journalism, for 16 years (1854-70), being associated with the *Neue Münchener Zeitung* (afterward known as the *Bayrische Zeitung*), and in 1870 becoming secretary of the Schiller-Stiftung, at Weimar. His writings are various, including

novels, dramas, epics, songs, and ballads, the most important of which are his war songs, 'Wider Frankreich' (1870); 'Das Volkramslied' (1889); 'Gundel von Königssee,' and 'Das Mädchen von Capri,' all epic poems; 'Pesach Parden' (1871); 'Hilpah und Shalum,' and 'Der Wasunger Not' (1872), comic epics; the dramas, 'Tiberius' (1875), and 'Fortunat' (1895); the novels, 'Ein Revolutionär' (2d ed. 1871), and 'Tante Carlhora,' and several tales and romances, among which is 'Die Novellen des Architekten' (1896).

Grosseteste, Robert, English Roman Catholic prelate: b. Stradbroke, Suffolk, about 1175; d. Buckden, 9 Oct. 1253. He studied law, physics, and theology at Oxford and Paris, and, upon his return to England, attained an enviable reputation as a theologian, so much so that in 1214 he became archdeacon of Wifits, and in 1224 received the directorate of theology and became first *rector scholarum* of the Franciscan school at Oxford. In 1232 he took up the cause of the Jews against the king, defending them with great vigor, and in 1235 was elected Bishop of Lincoln, whereupon he undertook to make radical changes in his diocese and eliminate some of the many abuses prevalent there, the result of which was that though he was possessed of great force of character, his high temper and lack of tact and diplomacy led him into innumerable controversies. The most famous of these was with Pope Innocent IV., who, desiring to fill the lucrative positions in the church with Italians and Provençals, in 1253 sent the Bishop a request that he appoint his (the Pope's) nephew to the first vacant canonry in the cathedral of Lincoln. This Grosseteste flatly refused to do, and, as his clergy stood by him in his fight against this abuse, the matter was finally dropped and it is mainly upon this incident that his fame rests. He was, though, a man of great scholarly attainments, Hebrew, Latin, Greek, French, mathematics, medicine, and music being numbered among them, beside which he was one of the most learned preachers of his time and a voluminous writer. Consult: Perry, 'Life' (London 1871); Luard (editor), 'Roberti Grosseteste Episcopi quondam Lincolnensis Epistolæ' in the Rolls Series (1862).

Grossi, Tommaso, Italian poet and novelist: b. Belluno, on the Lake of Como, 20 Jan. 1791; d. Milan, 10 Oct. 1853. He studied law at Pavia and settled in Milan, where he passed the remainder of his life as a notary, but his political ideas prevented his rise in his profession. His first attempt at poetry was 'La Principe,' written in the Milanese dialect, and this was followed in 1816 by two shorter poems, 'La Fuggitiva' and 'La Pioggia d'Oro,' and in 1820 by 'Ildegonda,' a romance in verse. This poem became popular and set the fashion for that style of writing, the success which it attained encouraging him to write 'I Lombardi alla Prima Crociata' in 1826, a poem remarkable for its patriotic sentiment. Despite the fact that Manzoni gives praise to this last poem in his novel 'I promessi sposi,' and that the cost of printing was defrayed by a generous subscription, it was soon forgotten. This did not dishearten him, however, and in 1834 he published his 'Marco Visconti,' which at once excited public approval and became the pioneer of the

historical novel in Italy. His only other work of note was 'Ulrico e Lida,' published in 1837.

Grosso, Matto, mǎ'tō grō'sō, Brazil (q.v.), a western central state bordering on Bolivia, Argentina, and Paraguay. It has an area of 532,500 square miles and an estimated population in 1910 of 137,000. Capital Cuyabá (q.v.).

Grosvenor, grō'vē-nōr, Edwin Augustus, American educator and author: b. Newburyport, Mass., 30 Aug. 1845. He was graduated at Amherst College in 1867 and at Andover Theological Seminary in 1872, was professor of history at Roberts College, Constantinople, in 1873-90; and of European history at Amherst College in 1892-9. In 1899 he was appointed to the newly established chair of modern governments and their administration. His publications include translations from the French of Victor Duruy's 'Modern Times' (1894) and 'General History' (1898); 'The Hippodrome of Constantinople' (1889); 'Constantinople' (1895); 'The Permanence of the Greek Type' (1897); and 'Contemporary History' (1899), extending from 1848 to the present time.

Grote, George, English historical writer: b. Clayhill, Kent, 17 Nov. 1794; d. London, 18 June 1871. After having studied at the Charterhouse, in 1809, he became a clerk in his father's banking house. He kept on with his studies, particularly with philosophy, and his liberal trend of thought gradually drew him into politics. He had written and spoken much in favor of the Reform Bill which was passed in 1832, and in that year he was elected to the House of Commons from London, which seat he continuously occupied until 1841. During all these years he had steadily worked upon his 'History of Greece,' the idea of which was suggested to him by the spirit of partiality displayed in Mitford's 'History of Greece' and which he had severely criticised in an article in the *Westminster Review* (April 1826). He had as early as 1823 devoted himself to the study of Greek history, for a sympathetic interpretation of which his extreme liberality made him admirably suited, and though to a certain extent the spirit of democracy is evident in the 'History of Greece,' yet the facts are placed before the reader with the idea that he will form his own conclusion. His private and public duties had prohibited literary work and it was not until he retired that he completed the first two volumes which appeared in 1845, the last volume of the set, the twelfth, appearing in 1856. Grote also wrote 'Plato and the Other Companions of Socrates' (3 vols., 1865); 'Minor Works,' edited by Alexander Bain (London 1873), and 'Aristotle,' which he left unfinished (2 vols., 1872). He had taken an active interest in educational matters, in 1860 becoming vice-chancellor of the London University, and in 1869 president of the University College, and also was elected a trustee of the British Museum. Consult: Mrs. Grote, 'Memoirs' (London, 1873); Alexander Bain, 'Character and Writings of G. Grote,' prefixed to his 'Minor Works' (London, 1873).

Grotendorf, Georg Friedrich, German archæologist and philologist: b. Münden, near Cassel, Prussia, 9 June 1775; d. Hanover, 15 Dec. 1853. He received his early education at

Hanover and Ilfeld, and completed his studies at the University of Göttingen (1795-7). He became prorector and later conrector of the gymnasium at Frankfort-on-the-Main (1803-21), and for nearly 30 years (1821-49) was director of the lyceum at Hanover. His research in the field of Latin philology was of great value, but his importance is chiefly due to the fact that he first deciphered the old Persian inscriptions of Persepolis, presenting the results of his labors in a paper before the Academy of Science at Göttingen, 4 Sept. 1802. Chief among his publications are: 'Rudimenta linguæ Umbricæ' (1835-8); 'Neue Beiträge zur Erläuterung der babylonischen Keilschrift' (1840); 'Zur Geographie und Geschichte von alt-Italien' (1840-2); 'Rudimenta Linguæ Oscæ' (1839), etc.

Grotius (gro'chi-us), or DE GROOT, HUGO, Dutch scholar and statesman: b. Delft 10 April 1583; d. Rostock 28 Aug. 1645. He was a pupil of Joseph Scaliger at the University of Leyden, conducted his first lawsuit in his 17th year; and in his 24th was appointed advocate-general. In 1613 he became syndic, or pensionary, of Rotterdam. In 1615 he was sent to England in order to arrange the difficulties arising from the claims of the English to exclude his countrymen from the Greenland whale-fishery. He declared himself on the side of Barneveldt (q.v.) in the struggle between the Remonstrants and their opponents, and was sentenced to imprisonment for life in the fortress of Loevenstein. He succeeded in escaping by concealing himself in a chest, and after wandering about for some time in the Catholic Netherlands escaped to France, where Louis XIII. gave him a pension of 3,000 livres, withdrawn in 1631. He returned to Holland, but by the influence of enemies, was condemned to perpetual banishment. He later went to Hamburg, and in 1634 to Stockholm, where he was appointed counsellor of state and ambassador to the French court, in which post he remained for ten years. On his return to Sweden by way of Holland he met, in Amsterdam, with a distinguished reception. Most of his enemies were dead, and his countrymen repented of having banished the man who was the honor of his native land. With the talents of the most able statesman, Grotius united deep and extensive learning. He was a profound theologian, excellent in exegesis, his 'Commentary on the New Testament' being still esteemed; a distinguished scholar, an acute philosopher and jurist, and a judicious historian. His writings have had a decisive influence on the formation of a sound taste, and on the diffusion of an enlightened and liberal manner of thinking in affairs of science. As a critic and philologist he seizes the genius of an author with sagacity, illustrates briefly and pertinently, and amends the text with facility and success. His metrical translations from the Greek are executed with the spirit of a poet. Among the modern Latin poets he holds one of the first places, and he also tried his powers in Dutch verse. But the philosophy of jurisprudence has been especially promoted by his great work on natural and national law, 'De Jure Belli et Pacis,' which represented the study of twenty years and laid the foundation of the new science of international law; besides which he wrote 'Annales et Historiæ de Rebus Belgicis' (1657); 'Annotationes in Vetus Testamentum'

GROTON — GROUND-SLOTHS

(1644); 'Annotationes in Novum Testamentum' (1641-46). 'De Veritate Religionis Christianæ, and Poemata' (1617). See Butler, 'Life of Hugo Grotius' (1826); Hély, 'Etude sur le Droit de la Guerre et de la Paix de Grotius' (1875).

Gro'ton, Conn., town in New London County; on the Thames River, the New York, N. H. & H. railroad; opposite New London. In 1637 Capt. Mason stormed the fortress held by the Pequots, and many lives were lost, both whites and Indians. A more disastrous fight occurred here 6 Sept. 1781, when 800 British troops under Benedict Arnold attacked Fort Griswold (q.v.), which was garrisoned by 150 soldiers. The Americans heroically resisted, but were overwhelmed by numbers, and Arnold and his force entering the fort butchered 85 men and wounded 65. Soon after 35 of the 65 died from the effects of their wounds. This battle is known in history as the "Massacre of Fort Griswold." Groton contains ship-building yards, several manufactories, and the Bill Memorial Library. Consult: Caulkins, 'The Stone Records of Groton' (1903); 'History of New London County'; 'Magazine of American History,' 'The Massacre of Fort Griswold.'

Grouchy, groo-shê, **Emmanuel**, MARQUIS DE, French marshal: b. Paris 23 Oct. 1766; d. St. Etienne 29 May 1847. He acquired distinction in the revolutionary armies, and in the campaign of 1800 fought in the army of the Rhine under Moreau, and rendered important service at the battle of Hohenlinden. In the war with Prussia in 1806, and with Russia in 1807, he acquired new fame, and was sent to the army of Italy under Prince Eugene. At the battle of Wagram his masterly manœuvres contributed greatly to the victory. On the restoration he was banished, but allowed to return in 1815. On Napoleon's return from Elba he immediately joined him, was made a marshal, and obtained first the command of the army of the Alps, and then the command of the cavalry in the grand army. After the battle of Ligny he was sent on the following day with 34,000 men and 100 cannon to follow the retreat of the Prussian army under Blücher. While he here on the 18th engaged with Thielemann, Napoleon gave battle at Waterloo, the disastrous issue of which has been sometimes laid to Grouchy's charge, from having failed to observe how three divisions of the Prussian army were advancing to Waterloo to take Napoleon in flank and rear, while Thielemann alone remained at Wavres. Being again banished, he came to the United States, where he lived five years, but was permitted to return in 1819. After the July revolution he was elected to the chamber of deputies by the department of Allier, supported the new dynasty, and was appointed in 1831 marshal, and in 1832 a peer.

Ground Beetles. The family *Carabidæ*, predatory beetles of various sizes and appearance. It contains upwards of 1,200 described species, nearly all of nocturnal habit, and, consequently, dark, mostly black in color. Some species, however, are metallic green or blue, or beautifully variegated. The family contains many beneficial species, which roam fields, meadows and gardens, destroying many injurious pests. They fly freely at night, and seek concealment in the daytime under stones and logs and in other convenient hiding-places. Most

species are terrestrial, but a few forms, such as species of *Calosoma*, known as 'caterpillar-hunters,' climb the trunks of trees in search of noxious caterpillars which they destroy. A remarkable genus is that of the bombardier beetles (q.v.). A very few are occasionally injurious, among them *Agonoderus pallipes*, which burrows into newly planted seeds of corn; and two species of *Harpalus* which are destructive to strawberries. These latter insects are interesting because of their dual habit of being carnivorous as well as herbivorous. They attack, in the beetle stage, the seeds of Ambrosia, and also eat insects of various kinds.

Ground-cherry, herbaceous plants of the potato family, constituting the genus *Physalis*, scattered through most of the world. About 35 species are natives of the United States, and some are known as 'tomato strawberries,' and are cultivated for the sake of their berry-like fruit, which is hidden within a persistent red calyx.

Ground Cuckoo, a coucal (q.v.).

Ground-dove, any of various species of pigeons which live mainly on the ground and seek their food there. The name is especially given to the genus *Columbagallina*, small birds of the warmer parts of America, of which one gentle and familiar species (*C. passerina*) is well known in the South Atlantic States, along the coast. The bronze-wing pigeons of Australia, and the large pigeons of the genus *Goura* (q.v.) are also so called.

Ground Ivy, a familiar European labiate plant (*Glechoma hederacea*), allied to mint, with a creeping stem and purple flowers. The leaves are crenate-reniform and the flowers are in threes. It was formerly employed to flavor ale and also medicinally.

Ground-nut, a climbing plant (*Apios apios*) of the pea family, which puts out dense clusters of dull purple flowers after most other plants have stopped blooming; these are velvety within and sweetly fragrant. The tuberous rootstock is edible, whence the name.

Ground-rent, in law, is the rent paid to the landlord by a person for the use of ground on which he intends to build. The usual arrangement is for a specified time, generally for a period of ninety-nine years. On the expiry of this period the whole of the building becomes the property of the ground-landlord. The ground-landlord is able, when his rent is in arrear, to distrain all the goods and chattels found on the premises, to whomsoever they may belong; and as the ground-rent is generally a small sum compared with the furniture of a tenant, he is always certain of recovering its full amount. This power of distress exists whether the tenant has paid his house-rent to his landlord or not, but the tenant may deduct the amount from the next rent he pays. See LANDLORD; RENT; TENANT.

Ground-sloths, a family (*Megatheriidae*) of extinct edentates, related to the modern sloths, but of terrestrial habits, and, in respect to many of them, of gigantic size, which are of special interest because some survived into the human period. They exhibit the head and teeth of a sloth, associated with the vertebræ, limbs and tail of an ant-eater. They were chiefly South American, but spread as far as North America

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in the Pliocene and Pleistocene epochs, and became extinct in very recent, but probably prehistoric times. *Megatherium* (q.v.) is the largest and most familiarly known genus; it almost equalled an elephant in size, and surpassed one in its massive proportions. *Lestodon*, *Myloodon* (q.v.), *Scelidotherium*, and *Megalonyx*, were smaller but more common forms. The discovery of part of the hide of one of these animals, genus *Glossotherium*, in a cave at Last Hope Inlet, Patagonia, showed that their skin was thick, studded with small embedded bony nodules, and thickly covered with long, coarse, yellowish-brown hair, as well preserved as are the feathers of the moas in New Zealand. The skin, says the discoverer, Dr. Moreno, of Buenos Ayres, shows patches of red color, suggesting of course blood-stains; and when small bits were chemically analyzed they yielded serum and the substances of glue. In view of this it seems impossible to believe that the skin can be of any great age, for bacteria would have finished their work upon the serum and gelatine long ago. An equally fresh-looking skull was found, as though in a small stone enclosure, and wounded in such a way as only man could have inflicted; and there are legends among the Indians that such creatures were known to their ancestors. Dr. Moreno is of the opinion, from evidences found in this cave and elsewhere, that these animals had been domesticated by man, but to what extent and for what purposes is unknown.

Consult Beddard, 'Mammalia' (1902), where further references are cited.

Ground-snake, one of the little, burrowing worm-shaped snakes of the genus *Carphophis*, which abound in tropical America. One species (*C. amarus*) is numerous under stones and logs in the Southern States, and is glistening chestnut in color above and salmon-yellow beneath. A larger, more purplish species (*C. vermis*) is called "ground-worm" in Louisiana. These snakes are perfectly harmless, and are the least specialized of the *Colubridæ*.

Groupers (Anglicized form of Spanish name "Garrupa"). Tropical and semi-tropical sea-bass of the genera *Epinephelus*, *Promicrops*, *Mycteroperca* and their allies. All are valuable food-fishes and most of them of large size, bright coloration and high quality as game-fishes. About a dozen species enter the waters of the Southern States or California, the most common along the Atlantic coast being the red grouper (*E. morio*), called "Cherna" and by many other local names. It is a large fish (20 to 40 pounds), is particularly abundant on the west coast of Florida, keeps near the bottom and is a voracious carnivore, consuming large quantities of small fishes, as well as crabs, etc. It is a favorite with market-fishermen, because it bears so well the hardships of transportation. The yellow-finned grouper or rockfish (*M. venenosa*); yellow grouper (*M. olfax*); and black grouper of the Florida Keys (*M. bonaci*), are also large and important; while another black grouper (*Promicrops*) is the famous jewfish (q.v.) of sportsmen. Several other species are elsewhere described under particular names, as *CABRILLA*, *MERO*, *SCAMP*, etc. Consult 'American Food and Game Fishes,' by Jordan and Evermann (New York 1902).

Groups, Theory of. Everywhere in mathematics are encountered systems of *operations*, possessing definite laws of combination. Thus, two geometric motions compound into a single motion, two algebraic transformations into a single transformation, under laws as definite as the primordial 2×2 of arithmetic but otherwise capable of infinite variety of simplicity and intricacy. Consider, for example, the 12 rotations of a regular tetrahedron into itself. Any two of these rotations compound into a third one among them, easily identified on a model. By a simple convention, these various combinations can be registered in algebraic form. The several rotations may be designated by the marks a, b, c, \dots ; the symbol ab may indicate that a is followed by b , and at the same time designate their resultant effect. This resultant ab is called the *product* of a and b in the order written; it is itself one of the 12 rotations, say c , and we write $ab = c$. It is an instructive exercise to tabulate the products of two or more of the 12 rotations, identifying each product with one of the 12 original rotations. It is possible to express all the 12 rotations as products of two of them, say of the rotation a through 120° about an axis through one of the four vertices of the tetrahedron and the rotation b through 180° about an axis joining the middle points of two opposite edges. It may be noted that the products ab and ba are here not the same rotation: a and b are not *commutative* as in ordinary algebra. On the other hand aa , which is a rotation through 240° about the axis of a , is conveniently denoted by a^2 ; a^3 and b^3 , both of which restore every point to its initial position, may appropriately be equated to 1 (identity), which is included among the 12 rotations. The three rotations b_1, b_2, b_3 about the (triangular) axes joining the middle points of opposite edges of the tetrahedron will be found to be commutative; in fact $b_1b_2 = b_2b_1 = b_3$, $b_2b_3 = b_3b_2 = b_1$, $b_3b_1 = b_1b_3 = b_2$; ($b_1^2 = b_2^2 = b_3^2 = 1$).

The tetrahedral rotations furnish a simple instance of an *algebra of operations*. Any system of operations possesses such an algebra, of greater or less extent. And as many different systems of operations, taken from widely separated mathematical fields, often present one and the same algebra, these algebras are worthy of study by themselves, as generalizing and unifying instruments. Since each algebra is completely defined by the laws of combination of the symbols a, b, c, \dots , we may abstract the idea of operation entirely and deal with the pure algebra. This position having been reached, it is inevitable to the mathematical mind to reverse the order of thought and to devise algebras *a priori*, leaving their concrete interpretation for secondary consideration. In constructing such algebras, choice among the infinite possibilities will be dominated by the two principles of generality and usefulness. The two qualities are combined in high degree in the algebra of *groups*.

Definition of Group.—A system of symbols, or *elements*, a, b, c, \dots (finite or infinite in number), conceived as capable of multiplication with each other, is said to form a *group* if the following conditions are fulfilled:

(1). The product of any two elements of the system is a third element of the system.

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(2). The multiplication is associative: $(ab)c = a(bc)$, (but not necessarily commutative: ab and ba need not be equal).

(3). Equalities $ab = ab'$ or $ab = a'b$ require $b = b'$ or $a = a'$, respectively.

(Conditions (2) and (3) evidently hold for any ordinary kind of operations; (1) traces a significant boundary).

The order of a group is the number n of its elements. A group is briefly called finite or infinite, according as its order is finite or infinite.

The defining conditions (1)–(3), classic in their simplicity, possess a most extraordinary fecundity. From them alone proceed, by pure logical deduction, the vast and intricate systems which make up the algebra of groups.

As a primary deduction it may be noted that every finite group G contains one and only one element, identity (denoted by 1), such that for every element x of G $1x = x1 = x$. A proper power x^m of any element x of G is equal to this element 1; the lowest exponent m for which this is true is called the order of x ; every power of x is equal to one of the m powers $x, x^2, x^3, \dots, x^{m-1}, 1$. The inverse x^{-1} of x is defined by $x^{-1}x = 1 = x x^{-1}$, whence by (3) $x^{-1} = x^{m-1}$; then $x^{-2} = (x^2)^{-1} = x^{m-2}$, etc. The analogy to ordinary algebra (of m th roots of unity) is here perfect. These elementary principles may be illustrated by reference to the tetrahedral group G of order 12 above.

An infinite group does not necessarily contain the element 1 nor the inverse elements. Thus all the motions of a point along a line in one direction form an infinite group, but this does not contain the reverse motions nor the case of no motion. The prevailing tendency is, however, to restrict the name group to systems which contain the inverse of their elements, and consequently the element 1.

A part of the elements of a group G , taken by themselves, may form a group H , which is then called a *subgroup* of G . Thus the powers of any element x of G form a cyclical group H which is either G itself or a subgroup of G . The tetrahedral group has a subgroup of order 4 composed of b_1, b_2, b_3 and identity. The order h of a subgroup H of G is always a divisor of the order g of G . If p , where p is a prime number, is a divisor of g , G has one or more subgroups of order p , and the total number of these subgroups is of the form $kp + 1$, where k is an integer. If p^a is the highest power of p that divides g , $kp + 1$ is also a divisor of g . These theorems of Sylow and Frobenius are of great assistance in the analysis of groups of finite order. Thus a group of order pq , where p and q are prime numbers, has a single subgroup of order p ; it has also a single subgroup of order q , unless p is of the form $kq + 1$. Thus the order 15 = 5.3 presents only one case, while the order 21 = 7.3 presents two. For a further example, the icosahedral group of rotations, which is of order 60, contains subgroups of orders, 2, 4, 3, 5, and also 6 and 10. The 15 lines joining middle points of opposite edges of the icosahedron form five sets of trirectangular axes, each of which sets is converted into itself by a tetrahedral group contained as subgroup in the icosahedral group. There are no subgroups of orders 15, 20, or 30 present.

Isomorphism and Transformation.—Groups which have the same algebra are called isomor-

phic. Written in the same symbols, isomorphic groups are by definition identical. But in the practice the isomorphism requires to be detected, being veiled under dissimilarity of notation. Once detected among groups derived perhaps from quite different mathematical fields, isomorphism constitutes the unifying principle already mentioned. For example, the tetrahedral group is isomorphic with the group of 12 substitutions (rearrangements) which it produces among the four vertices of the tetrahedron; and the icosahedron group is isomorphic with the corresponding group of substitutions of the five trirectangular axis systems mentioned above. These isomorphisms contribute materially to the theory of equations of degrees four and five.

One instance of isomorphism is expressible by a universal formula. Let G be any group, with elements a, b, c, \dots , and let t be any element whatever capable of combination with a, b, c, \dots , under conditions (1)–(3); then the elements $a' = t^{-1}at$, $b' = t^{-1}bt$, $c' = t^{-1}ct, \dots$ form a group $G'(t^{-1}Gt)$, and this group G' is isomorphic with G . For if $ab = c$, for example, then $a'b' = t^{-1}at \cdot t^{-1}bt = t^{-1}abt = t^{-1}ct = c'$, so that not only a', b', c' form a group, but the algebra of this group is identical with that of G . The process of deriving G' from G is called *transformation* of G by t ; G' is called the *transform* of G by t . All transforms of a group G (by t, s, \dots) are isomorphic with G and with each other.

Transformation has a very simple concrete significance. Suppose that G is a group of operations, a, b, c, \dots performed on a field of objects A , and that t converts A into a second field of objects B ; then $t^{-1}Gt$, i. e., t reversed, followed by G , followed by t , produces among the objects B an effect precisely parallel to that produced by G on the corresponding objects A . For example, if A is a plane, G a group of operations in A , t a projection of A on a second plane B , then $t^{-1}Gt$ is the projection of the group G on B . Or again, if G is a group of rotations about an axis A , and t a rotation which moves A into the position B , then $t^{-1}Gt$ is a second group of rotations, precisely similar to G , performed about the new axis B . In general, transformation in the present sense is the concomitant, for operations, of transformations in the ordinary sense as affecting objects.

Group Analysis.—If G is any group and H any subgroup of G , all the transforms of H with respect to the elements of G are contained in G . These transforms are called the conjugates of H in G . Thus the subgroups of order 3 of the tetrahedral group are conjugate in that group. A noteworthy general example is that of the subgroups of order p^a (a a maximum) of a group G ; these $kp + 1$ subgroups are always conjugate. The number of conjugates of any subgroup H of G is a divisor of g . In the important case where its conjugates all coincide, H is an *invariant* subgroup of G . Every group G has two invariant subgroups, itself and the identical operation. If it has no other invariant subgroups, G is *simple*; otherwise G is *compound*. Thus the four rotations $1, b_1, b_2, b_3$ of the tetrahedral group form an invariant subgroup, this being in fact the only subgroup of order 4, of the tetrahedral group.

A *maximum* invariant subgroup H of G is not contained in any larger invariant subgroup

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of G . A *principal series of composition* of G consists of G and a series of subgroups, $H, I, J, \dots, 1$ of G , each of which is a maximum invariant subgroup of the preceding one. The ratios of the orders $g, h, i, j, \dots, 1$ of these subgroups is a principal series of *factors of composition* of G . Apart from their order of succession, these factors of composition remain the same for every principal series of composition of G . They play an important part in the theory of algebraic equations.

Every compound group G is reducible to a sequence of simple groups, whose orders are the factors of composition of G . Only simple groups present new problems. The chief problem of the pure theory of groups is therefore the determination of all simple groups. This problem awaits solution. All groups of prime order are simple. Simple groups of composite order are of rare occurrence, the only cases below order 2000 being one group for each of the orders 60, 168, 360, 504, 660, 1092. The number of different prime factors in the order of a simple group not of prime order is at least three, and the total number of prime factors is at least six (orders 60, 168, 660, 1092 being the only exceptions). No simple groups of odd order have as yet been found. Several series of orders of simple groups are known, for example, $\frac{1}{2}n!(n \neq 4)$, $\frac{1}{2}p^n(p^{2n}-1)$, ($p^n > 3$), etc.

A group whose elements are commutative is called an *abelian* group. Every subgroup and every element of an abelian group is invariant. The factors of composition are here the prime factors of the order.

Example of Group Construction.—Let a and b be two elements of prime orders p and q ($ap = 1 = bq$) and subject to the further condition $b^{-1}ab = a^i$. We find successively $b^{-1}a^2b = b^{-1}ab \cdot b^{-1}ab = a^i \cdot a^i = a^{2i}$, $b^{-1}a^3b = a^{3i}$, ..., $b^{-1}a^ib = a^{i^2}$; $b^{-2}a^ib = b^{-1}(b^{-1}a^ib)b = b^{-1}a^{i^2}b = a^{i^3}$, $b^{-3}a^ib = a^{i^4}$, ..., $b^{-k}a^ib = a^{i^{k+1}}$, ..., $b^{-q+1}a^ib (= 1a^i) = a^i = a^{ji^q}$, ..., $a^i \equiv 1 \pmod{p}$. If $p-1$ is not divisible by q , i must be 1, $b^{-1}ab = a$, $ab = ba$, that is, a and b are commutative, and their various products ab form an abelian group of order pq . (This group consists of the powers of one element, say ab .) But if q divides $p-1$, the congruence $i^q \equiv 1$ has roots i different from 1. Any one of these roots i having been chosen, the conditions $ap = 1 = bq$, $b^{-1}ab = a^i$ are consistent and lead again to a group of order pq composed of the distinct products $a^k b^l$; the last group is non-abelian. For $p=3$, $q=2$, the second group presents the *multiplication table*

1	1	a	a^2	b	ab	a^2b
a	a	a^2	1	ab	a^2b	b
a^2	a^2	1	a	a^2b	b	ab
b	b	a^2b	ab	1	a^2	a
ab	ab	b	a^2b	a	1	a^2
a^2b	a^2b	ab	b	a^2	a	1

Substitution Groups.—The permutations or substitutions of n given letters x_1, x_2, \dots, x_n form a group (the symmetric group) of order $n!$. The order of any group of substitutions of n letters is a divisor of $n!$. An individual substitution is written in cycles: thus $(x_1 x_2 x_3)(x_4 x_5 x_6 x_7)$, or simply $(123)(4567)$, signifies that x_1, x_2, x_3 are to be replaced by x_2, x_3, x_1 , and x_4, x_5, x_6, x_7 by x_5, x_6, x_7, x_4 . Every finite group is express-

ible as (isomorphic with) a substitution group. Thus in the case of the group of order 6 above, if we denote the elements $1, a, a^2, b, ab, a^2b$ for convenience by x_1, x_2, \dots, x_6 , the six lines of the table are obtained from the first line by the six substitutions $1, (123)(456), (132)(465), (14)(26)(35), (15)(24)(36), (16)(25)(34)$, which form a substitution group isomorphic with the original group.

Those substitutions of n letters x_1, x_2, \dots, x_n which leave a given function of x_1, x_2, \dots, x_n unchanged in form, form a group. Thus the function $\phi_1 \equiv x_1 x_2 + x_2 x_3$ is unchanged by the eight substitutions $G_1: 1, (12), (34), (12)(34), (13)(24), (14)(23), (1324), (1423)$. The substitution $t: (23)$ converts ϕ_1 into $\phi_2 \equiv x_1 x_3 + x_2 x_4$ and transforms the group G_1 of ϕ_1 into the group $G_2 \equiv t^{-1}G_1 t: 1, (13), (24), (13)(24), (12)(34), (14)(23), (1234), (1432)$ of ϕ_2 .

Interesting examples of substitution groups may also be obtained by determining those substitutions of n letters x_1, x_2, \dots, x_n which transform the substitution $(12 \dots n)$ into its powers. If n is a prime number, the order of this (metacyclic) group is $n(n-1)$.

For further discussion of substitution groups see the article GALOIS THEORY OF EQUATIONS.

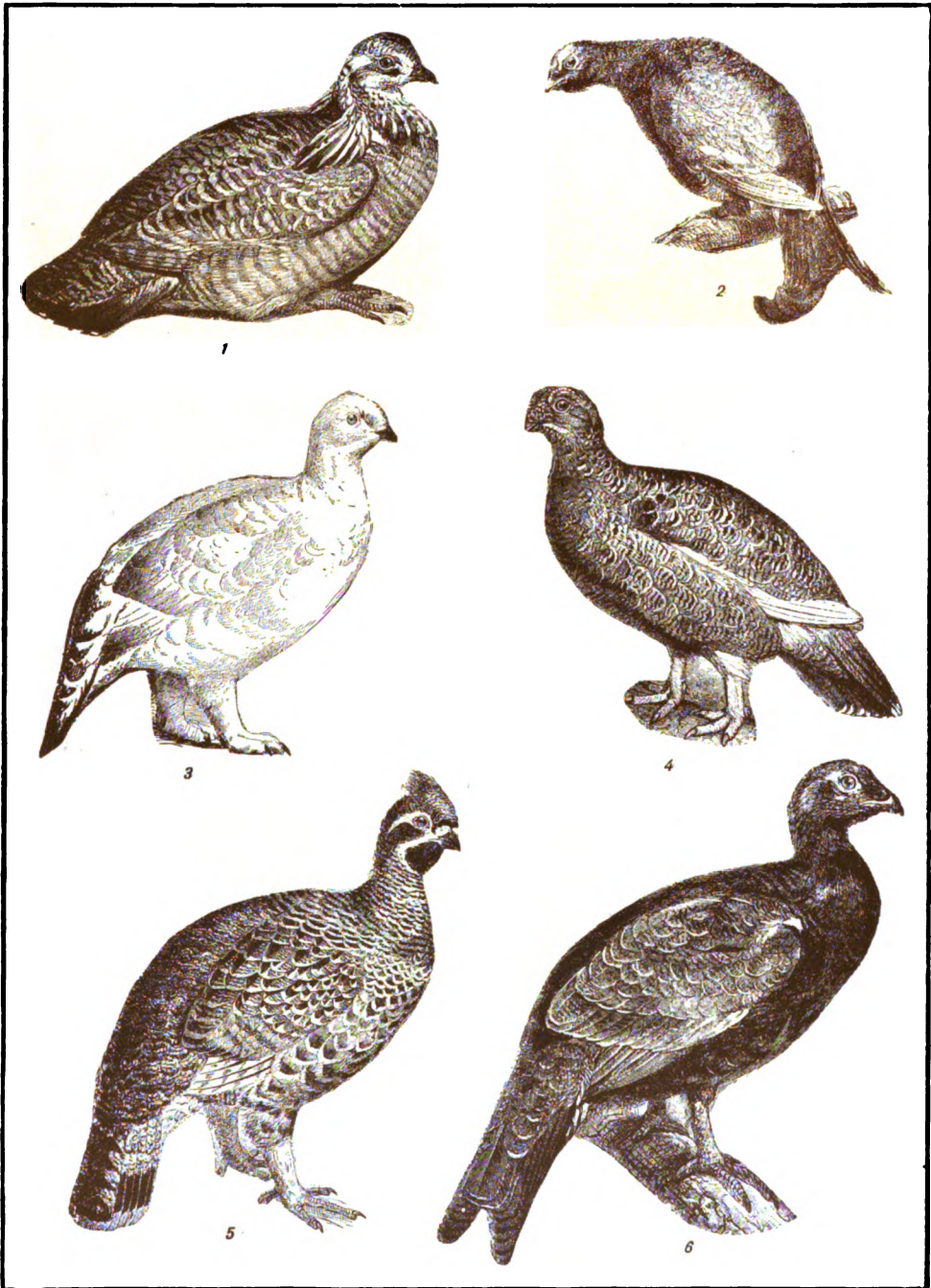
Groups of Linear Transformations.—All the linear transformations of a complex variable z , $z' = (\alpha z + \beta) / (\gamma z + \delta)$, for which $\alpha\delta - \beta\gamma \neq 0$, form a group. For two of them in succession evidently amount to a third linear transformation. Thus $S: z' = 1/z$ and $T: z' = 1 - z$ give $ST: z' = 1 - 1/z = (z-1)/z$, $TS: z' = 1/(1-z)$. The group of all linear transformations of z is both infinite and continuous. If $\alpha, \beta, \gamma, \delta$ are restricted to integral values, the resulting group is still infinite but discontinuous. The modular group is subject to the still further condition $\alpha\delta - \beta\gamma = 1$; this is the group connecting the values of the ratio ω of the two periods ω_1, ω_2 of the elliptic integral $u = \int (4z^3 - g_2 z - g_3)^{-1/2} dz$.

There exist only a finite number of non-isomorphic types of finite groups of linear transformations of z . If z is represented on a spherical surface, every rotation of the sphere produces a linear transformation of z . Those rotations of the sphere which convert into itself a regular solid inscribed in the sphere, or a regular polygon of n sides inscribed in a great circle (equator), form a group. These groups are of orders 60 (icosahedron, dodecahedron), 24 (octahedron, cube), 12 (tetrahedron), $2n$ (dihedron), n (cyclical). They give all the non-isomorphic types of finite groups of linear transformations of z . The octahedral group is also isomorphic with the symmetric substitution group of four letters, the tetrahedral and icosahedral groups with (alternating) substitution groups of four and five letters, respectively.

A simple example of a (dihedral) group of order 6 is generated by the transformations $S: z' = 1/z$ and $T: z' = 1 - z$ above.

The linear transformations of z written in homogeneous form $s'_1 = \alpha s_1 + \beta s_2, s'_2 = \gamma s_1 + \delta s_2$ furnish homogeneous linear groups. Increasing the number of variables, we arrive at the general homogeneous linear groups $s'_1 = \alpha_{11}s_1 + \alpha_{12}s_2 + \dots + \alpha_{1n}s_n, s'_2 = \alpha_{21}s_1 + \alpha_{22}s_2 + \dots + \alpha_{2n}s_n, \dots, s'_n = \alpha_{n1}s_1 + \alpha_{n2}s_2 + \dots + \alpha_{nn}s_n$ identified, for example, with projective geometry. Curves, surfaces, etc., frequently

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- | | |
|---|---|
| 1. Prairie Hen (<i>Tympanuchus Americanus</i>). | 4. Scotch Red Grouse (<i>Lagopus scoticus</i>). |
| 2. Blackcock (<i>Tetrao urogallus</i>). | 5. Ruffed Grouse (<i>Bonasa umbellus</i>). |
| 3. Moor-hen or Ptarmigan (<i>Lagopus albus</i>)
in winter dress. | 6. Hybrid between Blackcock and Capercailzie. |

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have linear transformations into themselves, these always forming a group. Thus a plane cubic curve has in general such a group of order 432. Linear congruence groups should also be mentioned. An example is the *simple* group of order $\frac{1}{2}p(p^2-1)$ ($p>4$) composed of the linear transformation $z = (az + \beta) / (\gamma z + \delta)$ when $a, \beta, \gamma, \delta, z$ are integers taken mod. p .

Continuous Groups.—These are groups of transformations involving continuous parameters, such as the entire group of linear transformations of z , or the entire group of motions in a plane or in space. The theory of these groups, which has been extensively developed by Sophus Lie and his followers since 1870, has important applications to geometry, and especially to the theory of differential equations.

Historical.—The theory of groups was originally developed by Galois, Cauchy, and their successors' under the particular guise of substitution groups. It was with Sylow's memoir in the 'Mathematische Annalen,' Vol. V. (1872) that the theory began to assume its independent abstract form. Among those who contributed to this movement are Cayley, Klein, Dyck, and others. But it is to Frobenius, above all others, that we owe the great developments of the pure theory which have been accomplished in the last fifteen years. The theory of group *characteristics*, recently created by Frobenius, is destined to produce brilliant results in the near future.

Other historical elements are traceable in the accompanying bibliography.

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Grouse, a family (*Tetraonidae*) of gallinaceous game birds with feathered feet or tarsi, inhabitants of the northern hemisphere. In North America our best known species is the ruffed grouse (*Bonasa umbellus*); the "partridge" of New England and the "pheasant" of the Middle States. This bird, in one or other of its races, ranges all across the continent from Canada to Washington and southward in the higher ground, and is one of our best esteemed game birds. The rumbling drumming of the male is a familiar sound in the woods in early spring, and is effected by rapidly beating the wings against the body. On the prairies of the central and western States are several varieties of pinnated grouse or prairie chickens (q.v.). In the northwest occur the blue or dusky grouse (*Dendragapus fuliginosus*) and the sage hen (q.v.). In Canada and the northernmost part of the United States occurs the Canada grouse or "spruce partridge" (*Canachites canadensis*) with the allied Franklin's grouse (*C. franklini*) in the northern Rocky Mountains. The species to which the name grouse was originally applied, namely the red grouse or moorfowl (*Lagopus scoticus*) of England, is the only bird absolutely

restricted to the British Isles. It is plentiful in suitable parts of Wales and northern England, but is especially numerous in the highlands of Scotland, where it is bred and preserved on moorlands of great extent, large areas of which are kept barren of other occupation for this purpose. This, then, is the bird whose shooting, permitted for a period following the 12th of August, attracts so large numbers of sportsmen annually to Scotland for the "grouse-shooting." The sport may be followed in the ordinary method of shooting on the wing over dogs; but in many places is conducted as a battue. Grouse-moors are owned and rented in large numbers, and have a status similar to that of deer-forests (q.v.). This grouse is a ptarmigan, other species of which exist in the arctic regions (see PTARMIGAN). Other European grouse of importance are the blackcock and capercailzie (q.v.). Among works dealing especially with grouse and grouse-shooting are Lloyd, 'Game Birds and Wildfowl of Sweden and Norway' (London, 1867); the volumes on 'Shooting' in the 'Badminton Library' (London, 1889); Alfalfa, 'Sport in Europe' (London, 1901); Sandys and Van Dyke, 'Upland Game Birds' in the Sportsman's Library (New York, 1902); Coues, 'Birds of the Northwest' (Washington, 1874).

Grove, Sir George, English engineer, author, and musical critic; b. Clapham, near London, 13 Aug. 1820; d. Sydenham 28 May 1900. After completing his studies in the grammar schools of Clapham, he learned civil engineering, and for two years worked in Napier's factory near Glasgow. In 1841 he went to the West Indies, erecting in that year the Morant Point lighthouse in Jamaica, and in 1845 the Gibb's Hill light in Bermuda. He was appointed secretary to the Society of Arts in 1849, and in 1852 to the Crystal Palace. While in the latter position he exerted all his influence toward giving the music-loving public the best music obtainable, and endeavoring especially to create a taste for the compositions of Beethoven and of the German Romantic School. From 1868-83 he was editor of 'Macmillan's Magazine,' and from 1878-89 edited the famous 'Dictionary of Music and Musicians.' In 1882 he was made the first director of the Royal College of Music, at the same time being knighted, and in 1894 was made a Commander of the Bath. He contributed to Smith's 'Dictionary of the Bible' (1864), and to Stanley's 'Sinai and Palestine' (1865).

Grove, Sir William Robert, English physicist; b. Swansea, 1811; d. 1896. He was graduated at Oxford in 1832, began the practice of law in 1835, but eventually applied himself to the study of physics. He was elected professor of experimental philosophy to the London Institution, 1840-47, and received the Royal medal from the Royal Society for his paper on the 'Gas Voltaic Battery.' Returning to the law he was knighted and made a judge of the High Court of Justice. He was one of the first to grasp the law of the "conservation of force." He is the author of 'The Correlation of Physical Forces' (1846).

Grove City, Pa., borough in Mercer County, on the Pittsburg, B. & L. E. railroad; 58 miles north of Pittsburg. It is the seat of the Grove City College, a coeducational school opened in 1884. The chief manufactures are

carriages, brooms, gas-engines, and machinery. Pop. (1910) 3,674.

Grover, Cuvier, American army officer; b. Bethel, Me., 24 July 1829; d. Atlantic City, N. J., 6 June 1885. He was graduated at the United States Military Academy in the class of 1850, and on the outbreak of the Civil War was appointed captain of the 10th infantry. Returning East, in April 1862, brigadier-general of volunteers, was assigned to duty with the Army of the Potomac, with which he participated in the various battles of the Peninsular campaign in Virginia, and in the second battle of Bull Run. In 1864 he commanded the 19th corps, and in the Shenandoah campaign was engaged in the battles of Opequan, Fisher's Hill, and Cedar Creek. He was mustered out of the volunteer service in 1865, and in 1875 became colonel of the 1st cavalry.

Grover, Lafayette, American politician: b. Bethel, Me., 29 Nov. 1823. He was admitted to the bar in Philadelphia in 1850, and settled in Salem, Ore., in 1851, where he became prominent in his profession, and was made prosecuting attorney of the second judicial district, and auditor of public accounts. In 1853 he was elected to the territorial legislature, serving there three years, and being speaker in his last term (1856). He fought in the Indian wars in 1853 and 1855-6, and was later made United States commissioner to audit spoliation claims. In 1857 he was a member of the Oregon constitutional convention, and when Oregon was admitted as a State, he was member of Congress (1858-9). He was chairman of the Democratic State committee (1866-70); served as governor of the State 1870-7; and was United States senator 1877-83.

Groves. See ASHERA.

Groveton, Va., Battle of. See BULL RUN, SECOND BATTLE OF.

Grow, Galusha Aaron, American statesman: b. Ashford (now Eastford), Windham County, Conn., 31 Aug. 1823; d. Glenwood, Pa., 31 March 1907. He was graduated from Amherst College in 1844, was admitted to the bar of Susquehanna County, Pa., in 1847, was elected to Congress in 1850, and was six times re-elected. During his first three terms he was a Free-Soil Democrat, during the last three a Republican. He was chairman of the committee on the Territories in the Thirty-fourth and Thirty-sixth Congresses, and speaker of the Thirty-seventh Congress, whose five-weeks' session of 4 July—Aug. 6 1861 largely defined the government attitude toward the Confederacy and voted \$500,000,000 for war purposes. He introduced the Homestead bill (see HOMESTEAD LAWS) into the House, fought for it 10 years, finally obtained its enactment, and signed it as speaker. In 1879 he declined the mission to Russia, in 1894 was elected from Pennsylvania as congressman-at-large, and was successively re-elected to the Fifty-fourth, Fifty-fifth, Fifty-sixth and Fifty-seventh Congresses. His plurality in 1896 was 297,446, the largest given up to that time in any State of the United States to a candidate for any office. He was also a delegate to the national Republican convention of 1864, 1884, and 1892, and chairman of the Pennsylvania State Republican committee in 1868. In 1871-6 he was the president of the International and

Great Northern railway company of Texas. His long record of conspicuous service is almost unparalleled in the political annals of the United States.

Growth, increase in size or volume. It may be divided into inorganic and organic growth. As an example of the former is the increase in size of minerals. Living beings or organisms grow by adding to the substances (protoplasm, etc.) forming their bodies similar matters as food, which are digested, assimilated, and thus taken into the body of the plant or animal by interstitial deposit. Organic growth is thus fundamentally a physico-chemical process together with a form of constructive energy as yet quite incomprehensible to us. The result of this absorption of food is that the body increases in size, that is, grows. All growth is attended by movement; and growth-movements are, as Verworn states, common to all living bodies, but they take place so slowly that they can scarcely be followed with the eye. Growth goes on more freely and the size of the body increases most rapidly in those organisms in which the body presents a large raying surface, in distinction from the microscopic bodies of the one-celled plants or animals. The simplest phenomenon of growth is seen in cells, which during growth rapidly multiply by self-division, which causes the increase in volume in the embryo.

The physical agents or factors in the growth of plants and animals are abundance of food, together with the influences exerted by heat, light, etc. During growth the simple molecule of living proteid continually attracts elements to itself from the food (Hatschek). Growth is most rapid in a well-fed plant or animal. The health, size, and stature of children depend on good nutritious plain food and plenty of fresh air.

Food and Chemical Agents.—As digestion and assimilation are chemical processes, they require certain materials to work with. These are called food. The elements which constitute food and which occur in protoplasm and flesh are carbon, oxygen, nitrogen, lime, phosphorus, potassium, sodium, chlorine, magnesium, sulphur, silicon and iron. All or any of these enter the body in various combinations, each playing a definite part in growth. Phosphorus is especially abundant in the tissues of embryos; potassium appears to be of great importance in imbibition, while iron is essential in the early processes of cell-division. Besides these inorganic substances, organic food, as flesh or vegetables, are essential to the growth of animals. Water is also essential, and embryos develop most rapidly in moist places or in water.

Light.—Without light there would be no growth, indeed no life. Light may retard or hasten growth, under different circumstances. Young growing plants and embryos of animals need to be protected from too direct sunlight.

Temperature.—Organisms need sufficient heat in order to grow. The requisite amount for normal, maximum growth is called the optimum temperature, for at such a degree of warmth growth takes place faster than at any other. If the temperature be lowered, the rate of growth gradually diminishes; if the temperature be raised too much above the optimum, the rate of growth diminishes more rapidly. Excess of cold dwarfs both plants and animals.

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Space and Movement.—If too much crowded, plants become slender and weak; snails become dwarfed if reared in too small vessels; mankind when confined to too narrow quarters in large cities tend to become undersized, from not having sufficient space and good air to live in; small trout live in small brooks and large ones in larger streams. All organisms need room to move or at least to grow.

Heredity.—Besides the factors already mentioned heredity has its share as an agent. Growth, development and reproduction are now in the plant and animal world proceeding as it were in grooves, or along more or less definite paths, in accordance with long established laws or relations, and the mechanism of growth is subject to heredity.

Growth and Longevity.—The elephant and whale attain a colossal size because they grow throughout life and live long. The large size of man as compared with many other mammals, is due to the fact that he grows for a longer period; while many mammals get their growth in one, two or three years, man does not stop growing until he is thirty.

It is to be observed that individual growth is not only dependent upon a suitable amount of food, but on proper environment and favorable conditions of life, and all these agencies also are the primary factors of organic life. It is the changes in the conditions of life, coupled with heredity and selection, that have caused the evolution of the world of plants and animals. Thus we see that the fundamental causes of the evolution of species are the same as those which determine the growth of any individual organism; we by no means understand all the phenomena of simple growth; there are unexplained laws and causes, as there are in general evolution; both in this respect are of a piece and are similar in their nature and results. The origin of species is as natural a process as the growth of the individual, and both in many respects are alike inexplicable by the science of the present day.

Growth and Development of the Human Being. In this article growth refers to an increase in size, and development to an increase in capacity. The body begins in a microscopic cell, and passes through the various stages of birth, growth, development, decline, and death.

The life of an individual may be studied in various periods, the embryonic and foetal (which do not concern us at this time) and those of infancy, childhood, youth, maturity, and old age. The above division is convenient, but not physiologically exact. The various periods are not sharply limited. From birth to maturity, with a gradual increase in size of various organs, there are progressive modifications of functions. Toward old age, decline begins and the modifications retrogress.

The Period of Infancy is variously limited by different writers, extending from birth to the end of the fourth, fifth, or even the seventh year, the last considered by law as the beginning of responsible life. Probably the best limitation is from birth to the end of the first dentition, about the end of the second year. At birth, connection with the mother suddenly ceases, and a new existence begins with the first inspiration. Then the vegetative functions, digestion, circulation, respiration, secretion, excretion, and assimilation, are soon established.

The infant performs all the functions of adult life except reproduction and volition. But in order to have them at their best they should be intelligently supervised by the parents. The young baby is the most helpless and dependent of all creatures. The care it receives influences its future life. With no care it must perish.

The period of infancy is characterized by frailty, active nutrition, rapid growth, and commencing development. It is especially prone to convulsions from improper food, or from high body temperature, whatever the cause, to rickets and scurvy from improper nourishment, to spasmodic affections such as false croup, to hydrocephalus, meningitis, whooping cough, diphtheria, diarrhoea, bronchitis, pneumonia, and to the eruptive diseases, measles, chicken-pox and scarlet fever.

The rate of infantile mortality is very high. From one fourth to one half of the children born in our large cities die within the first year; in small towns and in the country the rate is much lower. Many of the new-born are enfeebled by vices of formation, such as cyanosis, spina bifida, hydrocephalus, or meningocele, by an hereditary syphilitic, scrofulous, or tuberculous taint, or by chronic affections in the mother. All infants are exposed to the risks of an improper dietary, impure air, and the extremes of heat and cold.

The bones of the infant are very vascular, quite elastic, have but little firmness, and their epiphyses are cartilaginous. They are therefore readily inflamed, as in scurvy, may be distorted by pressure, or incompletely broken by apparently slight injuries, or the epiphyses may be separated by such injuries. To forcibly lift a young child by one arm is always dangerous. The skull at birth is not fully ossified and can be readily compressed. The anterior fontanelle begins to close about the 9th month and is usually closed about the 18th. Depression of this fontanelle is one of the evidences of general debility. Premature closure of the skull is a cause of epilepsy or idiotism. The vertebral column is straight, lacking the curves of later life, and is quite flexible, but this flexibility tends to backward, forward, or lateral distortions of the spine, as the result of rickets, inflammation (caries) of the vertebrae, or of sitting, standing, or reclining in strained positions. Allowing infants (especially feeble ones) to sit, stand, or walk too early tends to produce bow legs and knock knees, as well as spinal deformities. It is many weeks before a baby can hold up its head. Even by the twelfth week it is not properly balanced. It may be at the sixteenth. The first attempt to sit is about the sixteenth week, and sitting is accomplished about the fortieth. About the thirty-eighth week, the child attempts to stand, and should be able to stand alone by the eleventh or twelfth month, and to walk unaided by the fifteenth or seventeenth month. Some children never creep. If they do, the attempt is made about the ninth month.

The muscles of an infant are soft and not capable of great effort. Not till after the sixth month are they felt firm and resisting. To develop them the clothing should be loose, and the child, in a nude state, should at times be allowed free play of them. To swathe the feet and limbs in bandages "to make the child straight" is hurtful.

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The abdomen and chest (in its lower portion) are prominent, due to the very large liver, the small pelvis, and the distention of the stomach by food, and to large size of the heart and lungs. All of these organs must have free movement, in order to carry on their important functions. Tight bandaging of chest or abdomen hampers movement and compresses important blood vessels. The size and weight of the heart of the new-born explains the rapid growth of the body and those organs in most direct communication with the heart, especially the brain. The small size and the vertical position of the stomach account for the ease with which infants throw up their food when the stomach is distended. Repeated acts of vomiting are injurious. The practice of jolting babies tends to produce vomiting. Each child must be studied by itself as to its powers of digestion, and what is the proper food for each. The substitution of artificial feeding for maternal nursing, and the indiscriminate use of baby foods are responsible for much sickness and many deaths. But natural feeding is not always possible, owing to the dictates of fashion or the poor health of mother or child.

The nervous system of infants is very excitable, especially toward the end of the first year, and is out of proportion with the slow development of the inhibitory centres. Convulsions and spasmodic affections are therefore readily produced by various causes, such as undigested food, eruptive fevers, impure air, fright, or excessive heat. Most of the movements and actions of early infancy are reflex, such as stretching, crowing, and sighing, for example. About the fourth month evidences of will power appear and gradually increase. Good habits, as to regular times for feeding, sleep, etc., can often be inculcated at this early age, or even before, to the advantage of both mother and child. The brain is relatively large at birth and grows rapidly up to the seventh year, and after that time more slowly.

During this formative period care should be observed not to excite the brain unduly, else nervous disorders may result. Repeatedly urging a young child to "show off" is, to say the least, very unwise.

The senses of taste and smell seem to be partially developed at birth. After the third month the quick closure of the eyes on the approach of an object seems to indicate the establishment of true vision. A very bright light may be appreciated by the second or third day, or may be followed by the eyes, if moved slowly, after the sixth week. It is usually weeks before there are associated movements and convergence of the eyes. The eyes of the new-born frequently move independently of each other, producing "squint," but squinting in the course of a severe disease is a bad sign. As to colors, yellow, red, pure white, gray, and black, in the order named, are said to be the first recognized, gradually after the sixth month.

All children are born deaf, but may notice sharp sounds six hours after birth, though usually not until a number of days. Toward the end of the first year the infant begins to imitate vocal sounds in its attempt to speak.

The circulation of blood is very rapid; the blood vessels are large and thin. Congestions, inflammations, and hemorrhages, therefore, are

quite common. The pulse is irritable and slight causes disturb its rate and sometimes its regularity. The rate in the new-born is 130-140, during the first year 105-150 per minute, during the second 110-120, then gradually diminishes until at the fifth year it is about 90; from the seventh to the fourteenth year 80-90, and afterward 70-80. The respirations of the new-born are from 30 to 50 per minute, and at the end of the first year from 25 to 35. The breathing of healthy children is noiseless and through the nose. The habit of mouth breathing usually caused by enlarged tonsils and by adenoid growths, is productive of deafness, change in facial expression and distortion of the chest (pigeon breast). The relatively small size of the pharynx, larynx, and trachea frequently cause throat affections to be serious ailments in infants.

The average temperature of the infant is 100° F., but it is subject to many fluctuations. It is raised by ingestion of food, struggling, crying, etc., and lowered by sleep, inactivity, and insufficient food. Sponging with cool water or oiling the skin will frequently lower a high body temperature, which, if unchecked, might cause convulsions.

In man there are two sets of teeth. The first or temporary teeth are 20 in number, 10 in each jaw. The first tooth appears about the seventh month, the last about the twenty-fourth month. The dangers of dentition are much exaggerated. Well-nourished children of healthy parents cut their teeth earlier, easier, and more regularly than do feeble children. If the first tooth is not cut before the 14th month there is some serious defect. About the 6th year (and before the temporary teeth are shed) the jaws contain all the temporary teeth and all the rudimentary permanent teeth except the wisdom teeth. At birth, when the teeth have not appeared and in old age when they have disappeared the lower jaw is obtuse. During the growth of the teeth, the lower jaw increases in depth and length. To admit of these changes, the temporary as well as the permanent teeth should be taken care of, and filled if need be. Food requiring mastication should not be given until there are several teeth. The permanent teeth are 32 in number, 16 in each jaw. The first one appears about the 6th year, the last from the 18th to the 24th or later. The thymus gland appears in the new-born, attains its full size by the end of the 2d year, then gradually diminishes until at puberty it has almost disappeared. It is supposed to be one of the sources of the red blood corpuscles.

For the first few months of life tears and perspiration are rare. After three months they are freer. In rachitic infants perspiration is often profuse. Up to the end of the first year the sebaceous glands are very active, especially upon the scalp. The saliva and pancreatic juice are small in amount until about the third month and therefore starchy foods cannot safely be given to young infants. The gastric secretion at birth can as a rule readily digest the *casein* of mother's milk, but has difficulty in disposing of other food. Mucus in the infantile intestines is copious, often ferments and may neutralize the feebly alkaline intestinal juices, and the pancreatic juice and saliva.

Both the small and large intestine are com-

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paratively long, and digestion and peristaltic action are rapid. These facts together with the small size of the stomach and the rapid growth of the body, require that the young baby be fed every 2 or 3 hours. The great length of the sigmoid flexure of the colon impedes the passage of feces and induces constipation, which should be relieved by *light* laxative medicines or, better still, by change in the diet.

The lymphatic glands are numerous and large in the infant and the communication between them and the general system is more marked than at any other period of life. They are readily congested and enlarged in affections of the throat, scalp, etc., and in scrofulous and syphilitic ailments.

The average weight of the male new-born child is 7 lbs. 11 oz.; of the female 7 lbs. 4 oz. For the first few days there is a loss in weight, then the weight gradually increases. Generally it is doubled by the 5th month and trebled by the 12th in breast-fed infants; in hand-fed, later. Usually a healthy child gains 20 lbs. in weight and 10 inches in height in first 2 years of life; in the 3rd year 4 lbs. and 4 inches. During next 6 years there is an annual increase of 4 lbs. and 2 or 3 inches; after the 10th year about 8 lbs. a year. About the 9th year in girls and the 11th in boys there is a diminution in the rate of growth, and at puberty (13th year in girls and 16th in boys) the activity of growth is the greatest. Between 12 and 15, girls grow heavier and taller than boys, but at 15 the boys again lead and maintain it through life. Growth usually continues to about the age of 25 in males and there may be a slight increase for 5 or 10 years afterwards. Girls usually attain adult stature at about 27 years. Weight usually increases in the male and frequently in the female to the 50th or 60th year, due to an accumulation of fat.

The Period of Childhood may be said to extend from the end of the second year to puberty or youth. By the end of infancy, the anterior fontanelle is closed, the temporary teeth are cut and the child is beginning to talk and walk, to use judgment and memory and to display independence. Childhood is characterized by active growth and development of the body and mind. Arrest of growth and loss of weight indicate malnutrition. On the other hand, while a very thin baby is abnormal, a very fat child or youth is, as a rule, one whose nutrition is at fault, or whose diet is too rich or generous.

The preparation of boys and girls for the duties and responsibilities of manhood and womanhood, requires especially that their brains, muscles, and digestive apparatus shall be strong. Nerve force must be stored not dissipated, and coddling is wrong. Their nervous systems are normally very active and sensitive to impressions, hence nervous disorders and exhaustion are readily induced by over-stimulation of the brain, through excitement, too much study, etc. Physical and mental training must go together. A vigorous child is almost constantly in motion, either at work or play, and this is as it should be. The same amount of exercise would exhaust an adult. It is well understood that systematic muscular exercise besides hardening the muscles improves the mental strength, that well developed children take a higher rank in

school than those of the same age less developed. Abundant out of door exercise also develops the co-ordinating power of muscles and the special senses, induces a greater respiratory range, better oxidation, and an increased power of the heart. Thus nutrition is stimulated and a symmetrical development obtained. And this is just as necessary for girls as for boys. Children need sleep oftener and longer than adults. A healthy young baby sleeps nearly two thirds of the time and a healthy child of seven will often sleep quietly for twelve hours or more. Disturbed sleep and sleeping with the mouth open indicate some nervous gastric or intestinal disturbance or the presence of enlarged tonsils.

After the first few years of life the special senses seem to acquire an acuteness, more marked than in later life when the perceptions are associated with more complex mental processes. Children require much food and the diet should be nutritious, but overloading the stomach, especially with sweets and fruit, may excite general convulsions, vomiting, diarrhoea and alarming fever. A vigorous, healthy boy often eats, and may require about as much food as the average man. A variable appetite or the habit of eating mainly one class of foods is indicative of innutrition. A properly mixed diet is necessary for health. Sugar (candy, etc.), valuable in reasonable amount, should not be eaten in such quantity as to interfere with the appetite for regular meals. Children, especially those who eat but little sugar, should be taught to eat fat. In childhood the lymphatic system is still active, the glands readily enlarge as the result of irritation or of general disease, especially scrofula. The respiration in early childhood as in infancy is mainly diaphragmatic—the abdomen moves freely. The temperature normally is about 100° F. A sudden high temperature is much less significant than in the adult, so also is an increase in the rapidity of the pulse. Young children lose heat readily from the surface of the body, and are susceptible therefore to "taking cold" when insufficiently clad. The line should be carefully drawn between overdressing and the "hardening" process, and woollen garments except in the hottest weather are advisable.

Owing to the large amount of food consumed and the detritus resulting from the activities of the body—a free discharge of waste by the skin, kidneys and bowels should be facilitated by frequent bathing, the drinking of considerable pure water and the use of fruit, graham bread and green vegetables.

The stomach in children is straighter and more vertical than in adults, but less so than in infants. Vomiting is still easily produced. The small intestine is relatively much longer than in adults, due to the fact that much nourishment is to be digested.

Children are susceptible to nervous disorders such as chorea and certain forms of paralysis, and to whooping cough, mumps, measles, etc., which last are often classed as "children's diseases." Spinal deformities are readily induced. Certain diseases, such as tuberculosis, are likely to affect a large number of organs at the same time. The recuperative power of a normally healthy child is very great, even in severe diseases.

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The mortality of young children in general is enormous but decreases with age. It is greatest among those whose hygienic conditions are bad, who suffer from poor or insufficient food, impure air, etc. Diphtheria, scarlatina, measles, croup, pneumonia and intestinal disorders are the chief causes of death.

The Period of Youth, Adolescence or Puberty, is that period of life between childhood and maturity; in law, "that period from 14 in males and 12 in females till 21 years of age." It occurs earlier in hot climates than in cold, is hastened by luxurious living and habits of idleness and is retarded by severe labor, hardship, privation and ill health. It is that period when the individual becomes fitted for reproduction by the development of the sexual organs. The voice is unsettled, due to a rapid general enlargement of the laryngeal cartilages and a lengthening of the vocal cords. Hair appears in the pubic region, in the axillæ and on the face in the male. In the female particularly, fat is rapidly deposited in the subcutaneous cellular tissue of the breast and extremities, adding to the comeliness of the form. The function of menstruation is established, preceded in a varying degree by headache, backache, physical and mental lassitude, palpitation, bleeding from the nose, nervous irritability and hysteria. Sexual maturity is evidenced by awakened sensibilities towards individuals of the opposite sex, of attraction, of repulsion or of timidity and shyness. In youth there is a pronounced development of the limbs, an increase in the size of the chest and a diminution in the size of the head and abdomen. The spine now forms a double curve, and the pelvis widens especially in the female. Mental faculties mature. A girl becomes a woman earlier than the boy a man.

Inasmuch as the rapid nutritive changes are prone to be attended by more or less grave disturbances of the nervous functions, it is essential, in order to have a sound mind in a sound body (that is, health), to carefully regulate physical and still more, mental exertion. The habit of self control must be encouraged, and exaggerated language discouraged. School duties should not be imposed beyond, or even up to the limit of tolerance of the individual, and social functions should not interfere with an abundance of sleep and outdoor exercise, else the result will be a wreck of the nervous system, and prolonged nervous and muscular prostration. Recklessness as to the laws of health are responsible for much of the sickness at this period of life. Purity of thought and action are great safeguards against the temptations which beset growing youth, which if yielded to they impair or destroy both mind and body. Animal impulses are to be subordinated to aspirations of the mind. The continued fevers such as typhoid, severe inflammations, as pneumonia and acute rheumatism, tuberculosis and heart affections, are the principal diseases of youth. Scarlet fever, measles and other eruptive diseases may affect the individual, but not commonly. Alcoholism is a dangerous condition, easily acquired. Neurotic conditions, especially in the female, too frequently occur.

The Period of Maturity begins at about the end of the 21st year, and extends in men to about the 60th, when the power of reproduction

wanes, and in women to about 40 or 45, when the menopause occurs; the breasts and reproductive organs diminish and ovulation ceases. In women, at this time (as in the onset of puberty), the organic functions may be irregular; dyspepsia, palpitation, sweating, vertigo, neuralgia, irritability and melancholy may occur. The "change of life" is in reality therefore attended with a severe nervous shock. Manhood and womanhood begin when the individual has reached the full stature, when the skeleton is firmly ossified, the jaw is square, the chest fully expanded, and the limbs well developed. Gradually from this time onward in most instance, fat begins to accumulate, especially upon the abdomen, towards the end of maturity.

Popularly it is believed that man is in the "prime of life" from 35 to 50, but there are many instances of farmers, professional and business men and women being successful and at active work and in good health at 60 or more. The fact is, that the ability to do hard work, mental or physical, at an advanced age, depends upon habits of industry and method, and upon the care of the health which have been inculcated in earlier life, and are continued into and through adult life.

Gradually as adult life advances, the inclination and sometimes the power for active exercise fails. These are evils to be guarded against. Out-door games, horse-back riding, and vigorous walking, for example, may be pursued advantageously as a rule to 45 or 50 years of age. At about this time degenerative changes occur in the body and care is necessary that the heart and blood vessels be not overstrained. During the prime of life the body enjoys a maximum of vigor and power of endurance, and there is reason to believe that this is also true of the mind. But the self-consciousness of power that the individual possesses is frequently a menace, for it induces him to struggle for wealth or fame in the turmoil and bustle of modern life, to neglect recreation, to resort to alcoholics and other stimulants to keep up his energy, and to indulge in general high living. It is especially true at this time of life that no one should work up to the full measure of his ability. Such work is dangerous and has been responsible for the "breaking down" of the health and the death of many otherwise intelligent persons. The principal diseases of adult life are alcoholism, gout, cancer, urinary and venereal diseases, rheumatism, pneumonia, tuberculosis, affections of the brain and nervous system, of the heart and blood vessels and of the digestive system.

The Period of Old Age or Senility usually commences about the 60th year and is characterized by a waning of the vital powers and by atrophic and degenerative changes, the natural consequences of decay. While death frequently results from local accidents of the brain and nervous system (apoplexy, sclerosis, etc.) and of the heart, blood vessels and urinary organs irredeemably damaged in the course of decay, it is normally but the ending of a natural life, and not a pathological fact as in earlier life. The stature of the old is less, the shoulders rounded, bones are more fragile, the cartilages are hardened, the lower jaw resembles that of the infant, the chin is prominent, the skin is wrinkled owing to the absorption of fat, and loses its elasticity, the teeth decay and fall out.

urination is frequently difficult, the respirations and heart beats are reduced in frequency, the arteries have a tendency to ossify, the veins to dilate. The muscles fail in their tension, the voice becomes a "childish treble," the digestion is weakened, the eye no longer sees clearly, and hearing is dulled. The mind may preserve its freshness for a long time. Usually the senses fail first, next the faculties of memory, reason and volition. Towards the close of life the organic or vegetative phenomena prevail. The natural death occurs when the breath becomes fainter and fainter and the heart beats are weaker and fitful—and then gradually ceases.

Old people require an abundance of sleep. They need also to be kept warm, for heat is generated in them in smaller amount than in robust health. Hence they are easily chilled. Food should be plain, largely liquid, and that which is easiest digested. Exercise in the open air every day is desirable but it should be gentle in character. With these precautions old age may be made comfortable. **JEROME WALKER, M.D.,**
Author of 'Walker's Physiology.'

Grub, the larva of an insect, especially of a beetle or fly. In reference to cattle it usually means the maggot of a flesh-fly or warble. See **BOT-FLY**; **LARVA**.

Grubb, **SIR HOWARD**, Irish optician and telescope-maker: b. Dublin 28 July 1844. The largest telescope of his construction is the 27-inch of the Vienna Observatory. He was the first to suggest a movable floor for an observatory dome, which has been adopted in the dome of the great 36-inch telescope of the Lick Observatory. He has been vice-president of the Royal Dublin Society from 1893, and was knighted in 1887.

Grübel, **grü'bel**, **JOHANN KONRAD**, German poet: b. Nuremberg 3 June 1736; d. Nuremberg 8 March 1809. He was a saddler and harness-maker, and passed his youth in privation; but he possessed genuine poetic gifts, as shown in the pictures he has given of the lives and manners of his countrymen in the three volumes of 'Poems in the Nuremberg Dialect' (1802). Another volume appeared in 1808.

Gruber, **grö'ber**, **JOHANN GOTTFRIED**, German author: b. Naumburg, on the Saale, 29 Nov. 1774; d. 7 Aug. 1851. He studied at Leipzig, and in 1811 was appointed professor at the University of Wittenberg, and in 1815 professor of philosophy at Halle. His chief work was that of editing, first with Ersch, and after his death, alone the first section of the 'Universal Encyclopædia.' His independent works include: 'Herder's Characteristic' (1805); 'History of the Human Race' (1805); and 'Lives of Wieland (1815-16), and Klopstock (1832); he also edited 'Wieland's Complete Works' (1818-28).

Grün'berg, Germany, capital of the circle of Grünberg in the Prussian province of Silesia; on the Oder, 15 miles east of Giessen. It is surrounded by vineyards, and large quantities of wine are made here and in the vicinity. Pop. 21,268.

Grundtvig, **groont'vīg**, **NIKOLAI FREDERIC SEVERIN**, Danish theologian, historian and poet: b. Udby, island of Seeland, 8 Sept. 1783; d. Copenhagen 2 Sept. 1872. He was educated at the University of Copenhagen, and in 1822 went to Copenhagen as chaplain. He made a fierce attack on the rationalism of the time in his 'The Answer of the Church' (1825), a reply

to Professor Clausen, and for the violent expression of opinion in this work was severely censured and resigned his position. For a time he devoted himself to literary work, and through his writings exercised a great influence on the religious and political thought of Denmark. In 1839 he became pastor at the hospital church of Vartov, Copenhagen, and held that position till his death, being made a bishop in 1861. He was for a time a member of the Danish diet, and took an active part against Germany and German influence. His most important work is 'Northern Mythology'; he also wrote a number of poems, among them some very popular national songs, and translated 'Beowulf.'

Grundy, **Felix**, American jurist: b. Berkeley County, Va., 11 Sept. 1777; d. Nashville, Tenn., 19 Dec. 1840. Studying law, he was admitted to practice in 1798, and soon acquired a high reputation as an advocate in criminal cases. He was a member of the Tennessee legislature 1799-1806, and in the latter year was appointed one of the judges of the supreme court of errors and appeals. In 1811 he was elected representative to Congress, and re-elected in 1813. In 1829, and again in 1833, he was elected to the senate of the United States, where he was among the most prominent of the supporters of President Jackson. In 1838 President Van Buren appointed him attorney-general of the United States; but in 1840 he resigned that office, and was re-elected to the senate.

Grundy, **Sydney**, English dramatist: b. Manchester 23 March 1848. He was called to the bar in 1869 and practised till 1876, but has since become known at home, and in the United States, as a successful and popular playwright. Among his very numerous plays are: 'The Glass of Fashion' (1883); 'A Fool's Paradise' (1890); 'A White Lie' (1893); 'Sowing the Wind' (1893); and 'The New Woman' (1894); 'Slaves of the Ring' (1894); 'The Degenerates' (1899); 'Frocks and Frills' (1902).

Grundy, **Mrs.**, a personage constantly appealed to in the phrase, 'But what will Mrs. Grundy say?' in Morton's play, 'Speed the Plough' (1800), but who never appears among the *dramatis personæ*. The phrase has now come to stand for the judgment of society in general upon actions or conduct.

Grunt, or **Croaker**, a drumfish (q.v.).

Gruson, **groo'sön**, **HERMANN**, German inventor and manufacturer: b. Magdeburg 13 March 1821; d. 1895. He studied at Berlin; became chief engineer of the Wöhlert machine shops in Berlin in 1851, and in 1854 went to Buckau as director of the Hamburg-Mecklenburg steamship company. There he established a shipyard of his own and built a small iron foundry, where he invented a process of chilled cast iron, which was much used in the manufacture of machinery, as well as for armor. His establishment consequently grew rapidly, and in 1886 was incorporated, manufacturing armor for most of the states of Europe. Gruson was manager of the company until July 1891, when he retired and devoted himself mostly to study and experiments in physics. In 1893 the works were sold to Krupp.

Grützner, **Eduard**, **ed'oo-ärd grüts'nër**, German painter: b. Gross Karlowitz, Schlesien, Germany, 26 May 1846. He began the study of

GRYLLIDÆ — GUADELOUPE

art without a master, and his talent having been recognized by the architect, Hirschberg, he was taken by the latter to Munich, 1864. He was there admitted to the school of Piloty. He first appeared before the public as a humorous painter, Shakespeare's Falstaff being his favorite subject. He is, however, known all over the world for his pictures of monks, in the cellar, tailor's shop, kitchen, etc. Well-known also is his 'Mephistopheles Behind the Scenes in the Dressing Room of a Ballet Dancer.'

Gryllidæ, gril'ī-dē, a family, the crickets, of saltatorial orthopterous insects, distinguished from the grasshoppers and locusts by the fact that the tarsi are three-jointed and the ovipositor, when exerted, is spear-shaped; the wings, when present, fit closely to the body. The family includes three types: (1) the true crickets, such as the common field cricket, or the hearth cricket of Europe, which are of the genus *Gryllus*; (2) the burrowing, curiously modified mole-crickets (q.v.); (3) the tree-crickets, pale-colored nocturnal forms which lay their eggs in the twigs of different plants, and which sometimes are so abundant that by their egg-laying alone they do considerable damage to vineyards and to raspberry and blackberry plantations. The black field-crickets, of which the commonest American species is *Anabrus simplex*, inhabit burrows in the ground and come abroad to feed on grass and herbage at night, and sometimes in daylight. They deposit eggs in the ground in the autumn, but these do not hatch until the following spring.

Gryphon. See GRIFFIN.

Guadalajara, gwā-dā-lā-hā'rā, Mexico, capital of the State of Jalisco, and second only in population and importance to the City of Mexico, from which it is 380 miles distant by the line of the Mexican Central railway. Its altitude above sea level is 5,054 feet. The city possesses a great advantage in the nearby Falls of Juanacatlan which supply electric energy for its industries, street railway and lighting. In recent years Guadalajara has become a very important mining centre or headquarters for a district in which are many valuable properties, now being developed. Guadalajara is noted for its beautiful pottery and skillfully wrought "retratos" or figures in clay, and its drawn work. In the immediate vicinity is an inexhaustible deposit of clay the elastic qualities and pleasing color of which especially adapt it to the two purposes first above mentioned. Among other industries are manufactories of cotton goods, twine, and cordage, paper and leather articles. The hospitals include a Civil Hospital for both sexes, a Military Hospital, the Hospital of the Sacred Heart, for women, the Hospital Guadalupano, also for women, and the Beata Margarita Hospital, and Santissimo Trinidad Hospital for men. The city's educational facilities include a college of law, a college of medicine, a normal school, a young ladies' seminary, a lyceum, a high school, and a number of primary schools. The Cathedral, or most notable church of the city, is one of the grandest in the Republic, architecturally and in its dimensions, decorations, and ornamentation. The penitentiary of the State, an imposing structure, is located here, as also the various

other public institutions. Located in the city are two public libraries,—the State Library, with over 50,000 volumes,—and the Seminary Library with over 12,000 volumes; an Industrial Museum, a theatre, and the Governor's Palace. The principal public parks, some of which are exceptionally beautiful, are the Alameda, Plaza de Armas, Botanical Garden, Alcalde Park, and the Calzada de San Pedro. The banking facilities are supplied by the Bank of Jalisco, a local institution with a capital of \$6,000,000, the Guadalajara Banking Company, and branches or agencies of the National Bank, and the Bank of London and Mexico, of Mexico City; the Bank of Aguascalientes, and the Central Bank, of Mexico City. Pop. about 102,000.

Guadalupe-Hidalgo, gwā-dā-loo'pā-ē-dāl'gō, a village of the federal district of the United States of Mexico, at the foot of the Guadalupe Mountains, three miles north of the city of Mexico. The treaty of peace between the United States and Mexico was signed here 2 Feb. 1848.

Guadalupe-Hidalgo, Treaty of, 2 Feb. 1848; the treaty which closed the Mexican War. While the war was in progress, Polk sent Nicholas P. Trist of Virginia, then chief clerk of the State Department, to negotiate a treaty of peace; the conditions to include the cession of Upper and Lower California and New Mexico and the Rio Grande for boundary between Mexico and the United States. Trist went to Scott's headquarters, an armistice was arranged, and in August 1847 the three Mexican commissioners and Trist met and exchanged proposals. The former would not yield to such terms, demanded the Nueces as the boundary (giving them Corpus Christi and a large triangle at the south), and offered much less other territory. Trist was recalled, but remained at headquarters; Santa Anna declared that he was tricked in the proposals, war operations went on, and the city of Mexico was captured not long after. In January 1847 negotiations were resumed, Trist still acting as principal, and the treaty above was agreed on. The Senate, however, refused to accept it, and insisted on harsher terms; Mexico was forced to accept them, and the Senate ratified the treaty 10 March. Formal proclamation was made 4 July 1848. The land cession was of Upper California and New Mexico, and the Rio Grande was made the boundary. The United States paid Mexico \$15,000,000, and assumed \$3,250,000 of claims made by United States citizens against Mexico prior to the treaty, besides any claims to which under the conventions of 1839 and 1843 Mexico was adjudged liable. Of the 252 claims put in under this treaty, 182 were finally allowed. See MEXICAN WAR.

Guadeloupe, gā-da-loop' (Fr. gwād-loop), West Indies, an island of the inner chain of the Caribbees. (See ANTILLES.) It lies in lat. 15° N. and lon. 61° W. and, with its dependencies, has an area of 583 to 600 square miles. A strait divides it into two parts, called Basse-Terre and Grande-Terre. The former is very mountainous, and its volcanic character has been manifested most impressively by the eruption of La Soufrière in 1797 and the disastrous

earthquake in 1843. The eastern division, or Grande-Terre, on the contrary, is a calcareous plain, which at no point attains an elevation of more than 450 feet. The mean temperature of Guadeloupe is 78° F., the maximum being 101° and the minimum 61°. The dependencies referred to above are the adjacent islands, Maria Galante, Les Saintes, and Désirade. The chief products are sugar, coffee of the finest quality, and cocoa. Revenues amount to about \$1,300,000 to \$1,400,000 annually; expenditures, including the appropriations made by France from time to time, are somewhat in excess of that sum. Guadeloupe is a department of France, represented in the French chambers by one senator and two deputies. Its local interests are directed by a governor and a general legislative assembly of 30 members, the jurisdiction embracing one half of St. Martin, besides the islands which have been mentioned. There are nearly 100 elementary schools, with 11,000 pupils, and one *lycée*, with 350 pupils. The chief seaport, Point-à-Pitre, with about 17,000 inhabitants, is situated on the eastern side of Basse-Terre. Several times its buildings have been destroyed or severely damaged; in 1903 minor earthquakes were reported to be of frequent occurrence; and a fresh outbreak from La Soufrière was thought to be not improbable. Le Moule, the principal town of Grande-Terre, resembles Point-à-Pitre in size and situation. After the discovery, Guadeloupe belonged to Spain until 1635; in that year it was taken by the French; in 1794 England seized it, freed the slaves, and retained possession until 1802; then it passed again into French hands, together with Martinique, England taking St. Lucia in exchange; the restoration of slavery by the French was resisted by the negroes, and was attended with great suffering and loss of life; for a brief period in 1810 England once more held Guadeloupe, but returned it to France; emancipation was declared in 1848. The inhabitants are largely French mulattoes, with perhaps 15,000 coolies. Total population, including dependencies, about 167,000. Consult Hill, 'Cuba and Porto Rico, with the other Islands of the West Indies.'

MARRION WILCOX,
Authority on Spanish America.

Guadiana, gwā-(thē-ā'nā, a river of Spain and Portugal, which rises in the plateau of New Castile, flows first northwest, then circuitously southwest into and across Estremadura, and on reaching Badajoz turns southwest and forms part of the boundary between Spain and Portugal. Entering Portugal it flows past Monsaraz, Moura, and Serpa, to Mertola, again forms the boundary between the two kingdoms, and falls into the Atlantic between Castro Marim on the Portuguese, and Ayamonte on the Spanish side. Its course is about 515 miles, of which only 35 are navigable. Its chief tributaries are the Gigüela, Bullaque, Valdehornos, and Rubial on the right, and the Aziel and Jabalon on the left.

Guagua, gwā'gwā, Philippines, a pueblo of the province of Pampanga, island of Luzon, on one of the main channels of the Pampanga delta, 3 miles southwest of Bacolor. It is the port for Bacolor, has steamboat communication with Manila, and has an extensive business in groceries and drugs. Pop. 10,700.

Guaiacum, gwi-a-kūm, a genus of trees of the natural order *Zygophyllaceæ*, natives of

tropical America, remarkable for the hardness and heaviness of their wood, known as *lignum vita*, or Brazil-wood; also the peculiar resinous product of the common species (*G. officinale*). This is a tree 30 or 40 feet high, usually growing with crooked stem and knotty branches. The wood and resin have been obtained chiefly from Cuba, Jamaica, and San Domingo, but the tree is becoming scarce there. Guaiacum-wood is remarkable for the direction of its fibres, each layer of which crosses the preceding diagonally. It sinks in water. It is much valued and used for pulleys, casters, mortars, bowling balls, and other purposes requiring an extremely firm and durable wood. It is pale yellow on the outside but blackish brown near the heart, where it abounds in resin. Stimulative and other medicinal properties reside in the bark, leaves and resin of this tree.

Guaira, La, lä gwā-ē'rā, Venezuela, a seaport on the Caribbean Sea, five miles in a direct line (29 miles by rail) north of Caracas, of which it is the port. It is situated on a narrow coast strip between high mountains and the sea, and has an unhealthy climate. There are modern harbor works including a breakwater, and a considerable export and import trade is carried on. In 1901 the exports of coffee amounted to 7,290 tons; of cocoa, 3,776 tons; and of hides, 782 tons; the imports include manufactured goods, provisions, wines, etc. The town dates from an ancient Spanish settlement in 1588. In 1903 the port was blockaded by British and German fleets to enforce a settlement of commercial claims. Pop. 14,000.

Gual, gwāl, Pedro, South American patriot: b. Caracas 31 Jan. 1784; d. Guayaquil, Ecuador, 6 May 1862. He was graduated from the University of Caracas; joined the patriots in 1810, and was elected as a member of the legislature in 1811. In 1812, when the republicans surrendered, he escaped to New York, but in a few years returned, was made governor of Cartágena, and later sent as ambassador to the United States. He was admitted to the bar in Washington, and began the practice of law, but in 1816 joined Bolivar, was made governor of some of the conquered provinces, and was for a time minister of finance and foreign affairs. In 1858 he joined the revolt against Monagas, and was made president of the provisional government; in 1859 he was elected vice-president of Venezuela, and in 1860 became president, but resigned the next year, retiring to private life.

Gualeguay, gwā-lā-gwī', Argentine, South America, city in the province of Entre Rios; on the Gualeguaychu River. It is a trade centre for a region in which cattle raising is the chief industry. Pop. 7,810.

Gualeguaychu, gwā-lā-gwī'-choo', Argentine, South America, city in the province of Entre Rios, on the Gualeguaychu River, 11 miles from its mouth. Its chief industries are connected with the raising and shipping of cattle and wheat. Pop. 14,000.

Guam, gwām or goo-ām', or Guajan, gwā-hān', one of the Ladrone Islands, the southernmost and largest, and the only one with much population; east of the Philippines; occupied by the United States in 1898, the remainder of the group belonging to Germany. It is 29 miles long by 3 to 10 wide, and about 150 square miles in area; high and precipitous

GUAN — GUANAJUATO

on the eastern side, and forming a low plateau in the northern part, but mountainous in the south. About half the soil is arable, but only about one per cent cultivated. Except for the native clearings, most of it is thick and pathless jungle. Some of the trees are valuable hardwoods for ship-building or ornamental cabinet-work; others are useful for food, as the cocoanut (the finest here of all the tropics), pineapple, breadfruit, sour-sop and custard-apple, etc.; the hau (*Hibiscus tilaceum*) makes strong cordage, not affected by water; the pandanus' long leaves are braided into mats and hats; and the ylang-ylang is famous for perfume. Rice, sugar, tobacco, hemp, coffee, cacao, bananas, melons, etc., have been introduced and are cultivated. The only native mammals are rats, flying foxes, and bats; but the deer and wild goat, of European origin, have thriven plentifully, and cows and pigs are raised. There are no snakes; there are centipedes and scorpions, but none dangerous. The climate is very rainy, but mild except in midsummer, when the conflict of trade-winds produces a dead calm, oppressive heat, and storms, with some hurricanes. Earthquakes are frequent. The island is volcanic, with bordering coral reefs. The east side has but two good harbors, Pago and Tarofoto; the latter is the only one, except San Luis d'Apra on the west, which is safe for vessels all the year round. The island contains about 9,000 people; Chamorros with a mixture of Tagal and Malay, and some Anglo-Saxons from whaling ships, producing half-breeds with copper skins and light hair. They are nearly all in the villages; those with ranches build rough huts on them, where the family spend part of the time. Agaña (San Ignacio d' Agaña) is the only large town; it is a neat place with houses half of stone and half of wood or bamboo, and contains 6,400 people. Its best port is Apra (above), on a deep bay formed by a peninsula; its own harbor being dangerous in a storm from the anchors dragging on the coral bottom, and the landing bad from breaking reefs. There is a mission school, endowed in the 17th century by Maria Ana, queen of Philip IV. of Spain. The present capital is Agaña. The population by the census of 1910 was 8661. On 1 July 1909, the currency of the island was changed from Mexican to the United States monetary basis. (Wheeler, Report on Guam, 1900, War. Dept. doc. 123.)

Guan, gwān, a gallinaceous bird of the family *Cracidae*, genus *Penelope*, characterized by the front of the throat being naked and wattled; specifically *P. cristata*. It is about 30 inches long, nearly half of which is due to the tail. The color is a shining reddish-green, with rump and belly chestnut, neck and chest white-spotted, and the feet and throat red; the female is of a more reddish tint, with the crest, neck and mantle bordered with white. Though the guans have most of the habits of the curassow (q.v.), they are far less gregarious, noisy and restless. They take to trees when alarmed, roost there at night and often make their nests among the branches. They inhabit the American tropics, one species, the chachalaca (*Ortalis vetula*), ranging into Texas. Guans have long been domesticated in South America.

Guanabacoa, gwā-nā-bā-kō'ā, Cuba, a town

well situated on high ground near the city of Havana. The number of its inhabitants shown by the United States War Department census of 1899 was 13,963 (that is, 8,232 native white; 1,091 foreign white; 2,173 negro; 2,408 mixed; and 61 Chinese.) The total population (1910) is estimated at 10,500.

Guanaco, gwā-nā'kō. See HOUNACO.

Guanahani, gwā-nā-ā-nē. See CAT ISLAND.

Guanajay, gwā-nā-hi', Cuba, town in the department of the same name in the province of Pinar del Rio, about 30 miles west of Havana. It is situated in a hill region of much salubrity, and is a popular health resort. Here is the terminus of the Havana and Guanajay Railroad. Pop. about 9,000.

Guanajuato, gwā-nā-hoo-ā'tō, Mexico, a state bounded by the states of San Luis Potosi, Queretaro, Michoacán, and Jalisco. Area 20,276 square kilometres, or 7,806.26 square miles. The principal cordilleras traversing the state are the Sierra Gorda, in the northeast, and the Sierra de Guanajuato in the centre, which are formed by the junction of the Cordomiches, San Antonio, and Santa Rosa mountain ranges. The highest peaks are the Gigante (2,346 metres) and the Llanitos (2,815 metres). In the south and west are the valleys of San Judas, San Felipe, and Santiago, and the fertile plain of El Bajo Rivers are: the Lerma, with its affluents the Laja and the Turbio, the Irapuato, and a number of smaller streams. There are many mineral springs, and one lake, 37 1-3 square miles in extent, called the lake of blood (Yuririapundaro). Five mining districts merit special mention; namely, the Sierra Gorda, Alende, Santa Cruz, Guanajuato, and Leon, the principal mines being those which produce silver and gold, silver, mercury or cinnabar, tin, iron, lead or argentiferous lead, and copper or argentiferous copper. On 31 Dec. 1897 there were 550 claims registered, of which number 80 were in process of development. (See statistics given in connection with the department and city of Guanajuato.) The climate, except in the higher parts of the mountain ranges, is not unfavorable (mean annual temperature about 70°). The rainy season extends from the middle of May until the beginning of July. During those months the rainfall is heavy in the valleys, but only moderate in the mountains. See MEXICO — THE STATES OF.

Guanajuato, Mexico, capital of the State of the same name. Elevation 6,830 feet above the sea. Distance from the city of Mexico 252 miles, and 1,000 miles by the Mexican Central railway from the United States border at El Paso, Texas. It is situated in the heart of the Guanajuato mountains, in a picturesque ravine, six miles from the main line of the above named railway and overlooking a rich and beautiful region, while itself surrounded and honeycombed by mines hundreds of years old, which have produced unknown millions of precious metals and are still productive. Mining began here 500 years ago, developing as it proceeded, some of the richest deposits ever discovered. Over \$600,000,000 of gold and silver have been mined under and in the immediate vicinity of the city, fully two-thirds of which was gold. The buildings of the business centre are quite commodious and imposing and

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are very substantial, unlimited quantities of very superior building stone being immediately at hand. Among the prominent public buildings are the Government Palace, or State House, in which the legislature holds its sessions and the State officers have their offices, and the Opera house or Theatre, a magnificent stone structure copied from the Grand Opera House of Paris. In a remote part of the city are the famous Catacombs, wherein are stored the mummified remains of some 30 or 40 human beings representing both sexes, and several tons of human skulls and bones. At the opposite extremity of the city is the great dam of modern construction which contains the community's water supply. Another notable structure is the principal church of the city, built of the peculiar colored stone or marble which exists in great quantities in the immediate vicinity. It is surmounted by a dome of large proportions and exceptional beauty. There are several other churches, the ancient Mint, the State College, the Market de la Reforma, and the Castle of Granaditis. There is a street railway, and a thorough system of electric lighting. The Bank of Guanajuato, a local institution of \$3,000,000 capital, and branches of the National Bank and the Bank of London & Mexico compose the financial institutions of the city. There are a State College and a Normal School for young women; two museums,—one connected with the State College and devoted to natural history and mineralogy, and the other—the Museum of Ramon Alcazar—devoted to "Antiquities, Minerals, and Precious Objects." Two public libraries contain over 13,000 volumes. In 1905 the city was flooded and much valuable property destroyed. Pop. about 40,000.

Guanare, gwā-nā'rā, Venezuela, city, capital of the State of Zamor, near the Guanarito River, about 220 miles southwest of Caracas. Coffee and sugar-cane are some of the chief agricultural productions; but the city is the centre of an extensive cattle trade. Pop. about 11,500.

Guanes, gwā-nās', or **Guane**, Cuba, town in the province of Pinar del Rio; about 10 miles from the sea, and 120 miles southwest of Havana. The district court holds its sessions here. The trade in the products of the surrounding country, cotton, tobacco, and cattle, is extensive. There is also a large trade in lumber. Pop. about 17,000.

Guan'idin, a basic organic substance, having the empiric formula CH_5N_3 , and the constitutional formula $\text{H}_2\text{C}(\text{NH}_2)_2$. It may be prepared by heating an alcoholic solution of cyanamide and ammonium chlorid to 212°F . Guanidin is a crystalline, deliquescent substance, with strongly alkaline properties, and it absorbs carbon dioxide from the air. It forms numerous salts, and urea is evolved in many of its reactions. In fact, it is this close relation with urea that gives guanidin its chief interest, many authorities holding the opinion that guanidin is an intermediate product in the formation of urea from proteid bodies, in the normal physiological chemistry of the body.

Guanin, gwā'nīn, a yellowish-white, amorphous substance, which derives its name from

being a constituent of guano; but it also forms the chief constituent of the excrement of spiders, has been found attached to the scales of fishes, and seems to be a normal constituent of the mammalian liver and pancreas. With regard to its occurrence in guano, as it has not been found in the recent excrement of sea-birds, there is every reason to believe that it is formed by slow oxidation (from atmospheric action) of uric acid, much as uric acid can be made to yield urea and oxalic acid. And in the pancreas and liver it probably represents one of those transitory stages of disintegrated nitrogenous tissue which are finally excreted by the kidneys in the more highly oxidized form of urea. Guanin is a diacid base, but also forms salts with metals, and combines with salts. When heated with hydrochloric acid and potassium chlorate, it is oxidized to carbon dioxide, guanidin, and parabanic acid.

Guano, gwā'nō, Spanish *guano huano*, from Peruvian *huano*, dung, is the name for deposits of the partially decomposed and dry excrementitious matter of sea-birds, but it has been also extended to accumulations of a similar kind from land-birds, and even from bats in caverns. Deposits from sea-birds are got wherever there is good feeding-ground in the neighborhood of unfrequented islands and rocky cliffs, and such may be seen around many shores. But to render them of practical utility atmospheric conditions are requisite which are only found in certain localities, and all the great guano deposits exist in the hottest and driest parts of the tropics, as on the islands of the South Pacific Ocean. The most important of all were the deposits on the Chincha Islands off the coast of Peru, which for years yielded a considerable revenue, but are now quite exhausted. The guano which was found there was from 60 to 80 or 100 feet in thickness, and was entirely due to the droppings, accumulated for many ages, of the innumerable sea-birds which make these islands their resting-place and breeding-ground. The excrement which is at first pasty, rapidly dries by exposure to the sun in a part of the world where a fall of rain takes place once in a lifetime, and is looked upon as an historical event, and thus, while putrefaction is almost entirely arrested, the soluble salts of which guano to a great extent consists are retained. This guano, called technically Peruvian, is the most highly prized, and is regarded as a type of the substance; but quantities are or have been got from other localities, as Patagonia, various points of Bolivia, Mexico, and Chile, Malden Island and numerous other Pacific islands, new deposits being opened up as the older become less productive.

Guano varies extremely in composition, even in the same deposit considerable differences will be found; and when deposits from different localities are compared, there is sometimes no analogy except in the kind of substances present. Thus, some consist mainly of phosphate of calcium and other fixed salts, while others contain much volatile matter, with a large proportion of ammonia. To the latter belongs Peruvian guano, which is a very light, dry, non-cohesive pale-yellow powder, with a characteristic ammoniacal odor, and sometimes containing lumps, made up of different salts. It is a very complex mixture, containing the urate of ammonium, the oxalates

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of ammonium and calcium, the phosphates of sodium, ammonium, calcium, and magnesium, the sulphates of potassium, sodium and ammonium, the chlorides of sodium and ammonium, and the carbonate of calcium. There is always some moisture, organic matter of different kinds, sand from the rock on which the deposit lies, and this is sometimes considerable. These may be regarded as the possible constituents of guano, but the ingredients which are especially prized are the ammoniacal salts, the phosphoric acid, in combination with the alkalies and alkaline earths, and the alkalies themselves, particularly the potash. It is the remarkable abundance of these constituents and their fine intermixture which makes genuine Peruvian guano so much esteemed as a manure. It contains almost all the inorganic matter required by a plant, and that in a highly available form, so that it is one of the best of all fertilizing agents for different crops. Its use as a manure was known to the native Peruvians centuries ago, but no attention was paid to the accounts by modern travelers of its wonderful efficacy until A. von Humboldt took some to Europe, in 1804, and had it analyzed. It was not exported on a large scale till about 1850, and from that time the quantity sent to foreign countries, including large shipments to the United States, was very great, but the supply has latterly much fallen off.

As a substitute for ordinary guano, what is known as fish-guano has been in use for a considerable number of years. This consists essentially of fish and fish offal dried and powdered. In the case of oily fish, such as herrings, it is necessary to extract as much of the oil as possible before the operation of powdering; and it will thus be understood that different kinds of fish differ greatly as regards their value for manurial purposes. But all sorts of fish-guano contain a large percentage of ammonia and phosphate of lime, and are thus valuable as fertilizers.

Guanta, gwān-tā', Venezuela, a modern seaport on the north coast, in the state of Bermudez, 12 miles west of Barcelona, by rail.

Guantanamo, gwān-tā'nā-mō, Cuba, a town in the province of Santiago, situated at the head of the most important harbor east of the city of Santiago on the southern coast. Its surroundings were favorably known before 1898, for the beauty of the groves of lime-trees and lemon-trees, the coffee plantations, and the residences of wealthy planters, who made the heights overlooking the bay a favorite place of resort. Since the Spanish-American war, Guantanamo has been famous as the scene of certain military operations. On 19 May 1898 an unsuccessful attempt to cut the cable in the bay was made by the St. Louis and the Wompatuck. On 10 June a force of 600 marines landed from the transport Panther on the eastern shore of Guantanamo Bay, and undertook to make the outer harbor a secure place for the use of American vessels when coaling, or as a rendezvous and a refuge in stormy weather. The marines established their camp ("Camp McCalla") on a small hill, where they sustained the attacks of the Spanish troops for several days; and the courage and endurance displayed at this time must be regarded as memorable features of the war. The Marblehead and Texas lent assistance, the latter on 12 June sending 40 marines with two automatic guns. In the course of that week the

camp was protected by earthworks; other war-ships arrived and shelled the thickets in which the Spaniards were concealed, the forts, and the town; the garrison was strengthened by accessions of bluejackets and Cuban insurgents familiar with the country; and thus, when ten days had passed, the outer harbor was practically in the possession of the American forces. In July 1901 the United States government selected Guantanamo for one of the four naval stations on the Spanish coast. The number of inhabitants of the town of Guantanamo, according to the United States War Department census of 1899, was 7,137. The total population of the district (1910) 43,300, including native white, about 8,000; foreign white, 2,000; negro, 9,500; mixed 11,000; and Chinese, 200.

MARRION WILCOX,

Authority on Spanish America.

Guaporé, gwā-pō-rā', or **Itenez**, ē-tā-nāz', a South American river which rises in the Serra Aguapehi, in the state of Matto Grosso, Brazil, flows south, nearly parallel to the Jauru, passes the town of Matto Grosso, whence it is navigable downward for light draught vessels, then with a northwesterly trend forms part of the boundary between Brazil and Bolivia, and finally after a course of over 960 miles, unites with the Mamoré to form the Madeira.

Guarana, gwā-rā'nā, a dried paste consisting chiefly of the crushed or pounded seeds of *Paullinia sorbilis*, a climbing shrub, native of South America. The seeds are obtained largely from the cultivated plants, and in South America guarana is used much as tea or coffee is used in other countries. It is the staple drink of millions of people. Guarana is found in the drug market in the form of flattened cakes or cylinders of a dark reddish-brown color and showing on fracture numerous coarse angular fragments of seeds. The taste is astringent and somewhat bitter, becoming sweet on chewing. Guarana contains four to five per cent of caffeine, making it twice as strong as coffee. Its action, however, resembles more closely that of tea because of the high percentage of tannic acid it contains. In medicine it has been used in the treatment of sick-headache.

Guarana-bread, the seeds of the *Paullinia sorbilis* (a South American tree), pounded, made into cakes, and dried in the sun. It is extensively used in Brazil and other parts of South America as a stimulant and restorative, and as a material for making a refreshing beverage. The active principle of guaranine, is said to be identical with theine or caffeine (q.v.); and no known substance yields it so abundantly. Other species of *Paullinia* possess poisonous properties.

Guarantee, gār-an-tē', or **Guaranty**, in law, an undertaking to answer for the failure of another. The statute of frauds provides that no person shall be liable on any special promise to answer for the debt, default, or miscarriage of another person, unless a written agreement, or some memorandum in writing for such purpose, shall be signed by the promisor or some other party lawfully authorized by him. In the construction of a guarantee it is a general rule that the surety shall not be bound beyond the express words of the engagement. By the mercantile Law Amendment Act (England and Ireland), no special promise made to answer for the debt, default, or miscarriage of another is deemed

invalid to support an action, by reason that the consideration for such promise does not appear in writing, or by necessary inference from a written document. By a similar statute applying to Scotland, and passed in the same year, all such guarantees must be in writing, and if for a firm will cease upon a change of the members, unless intended by the parties by express stipulation or implication to be binding notwithstanding the change in the firm. Every person who becomes surety for the debt or obligation of another, and discharges his liability, is entitled to the assignment of all securities held by creditors. In the United States the common law on the subject of guarantee or suretyship was the same as that of England and a guarantee was equally forcible whether written or oral, but see SURETYSHIP.

Guard, National. See MILITIA.

Guardafui, Cape. See CAPE GUARDAFUI.

Guardi, Francesco, frân-chês'kô gwâr'dê, Italian painter: b. Venice 1712; d. there 1793. He was a pupil and follower of Canaletto; his work shows less exactness in detail than his master's, but is superior in use of color. His paintings are mostly of scenes in Venice; they include 'Procession of the Doge'; 'Fete of Corpus Domini'; 'Grand Hall of the Palazzo Ducale' (in the Louvre, Paris); 'Church and Piazza of San Marco' (National Gallery, London); and 'The Rialto' (Metropolitan Museum, New York).

Guardian Angel, an angel who watches over a particular individual. It is the general belief, in the Roman Catholic and Greek Churches that every man has a guardian angel who defends him from evil, suggests good thoughts and wise counsels, and helps him in prayer. This belief is based on the words of Christ in Matt. xviii. 10: "Their angels do always behold the face of my Father which is in heaven"; the Fathers of the Church strongly inculcate it, and in the lives of the saints instances are given of the active interference of guardian angels. The belief is shared by some Anglican high churchmen. The Roman Catholic Church celebrates the Feast of Guardian Angels on 2 October. See also ANGEL; GUARDIAN SPIRIT.

Guardian Spirit, a spirit that watches over the welfare of an individual or household. The belief in guardian spirits finds expression in some form in all primitive religions, and in many which have reached a higher stage of development. The Australian native believes that when a warrior kills his first foe the spirit of the slain enters the body of the slayer, and becomes his guardian; in Tasmania a native has been heard to ascribe his deliverance from danger to the care of his deceased father's spirit; and the most important religious rite of a North American Indian is to obtain a patron genius. In Asia, in Africa, and among the Indians of South America, the belief in guardian spirits obtains, as it did formerly among the Aryans of Northern Europe. Greeks and Romans believed that each individual was under the protection of a spirit who prompted him to good deeds, and guided him throughout his life; gradually there arose a belief in an evil spirit who was at war with the good spirit, and instigated every evil deed. These spirits were called in Greece, *Dæmons*, in Rome, *Genii*. The Romans also be-

lieved that the spirit of the founder of each family was the guardian spirit (the *Lar*) of the family and worshipped the *Lares* with special rites. For the Christian form of the belief see GUARDIAN ANGEL.

Guards. A guard, in the primary sense, is one who watches or protects a person or persons, a place, property, etc., against loss, danger, or harm; as a body-guard, a prison-guard, etc. Body-guards have been an inseparable accompaniment of monarchy from the earliest ages; the Assyrian and Persian kings employed them, and the corps of "Argyraspides," or silver-shields were selected by Alexander out of the bravest men of his army. The Roman emperors had their Prætorian guard. Napoleon I. first created a small troop of bodyguards, with the title of Guides, while he was yet only general, in his first Italian campaign. From this arose by degrees, the great institution of the Imperial Guard, consolidated in 1804, which 10 years later comprised 102,708 men, and after being disbanded by Louis XVIII. in 1815, was restored by Napoleon III. in 1854. It consists of infantry, cavalry, and artillery. In England, the Guards, otherwise called household troops, consist of two regiments of Life Guards, the royal regiment of Horse Guards, and three regiments of Foot Guards. Many of the European sovereigns before the French Revolution had small corps of foreign troops which served in this capacity. Thus the French had, in former times, the Guard of Scottish Archers, and at a later period, a body of Swiss guards, called the Cent Suisses. The Cent-Gardes formed by Napoleon III. are founded upon the latter. The Pope still retains his Swiss guards. In Prussia there is both infantry and cavalry of the guard, and the Russian imperial guard forms an entire corps d'armée 50,000 strong.

In general military use the term guard is of various distinct applications and denotes functions of great importance. It means a sentry on duty, and also a body of soldiers assigned, under the proper officer or officers, to the duty of guarding or protecting a camp, post, or any place where military control is established. Company and regimental details for guard duty are made according to circumstances—the number of men required or available, etc.—rank of officers being also regarded as far as convenient. Guard-mounting or inspection and review before the old guard is relieved, is a ceremony of much detail and is usually carried out with strict military observance.

Guasa, gwâ'sâ, or **Warsaw,** a name given in the Gulf of Mexico and West Indian region to various large groupers (q.v.), especially the jewfish (q.v.). "Warsaw" is an anglicized form of the Spanish word.

Guatemala, Republic of (República de Guatemala), the largest country in Central America; bounded on the north by Mexico, British Honduras, and the Gulf of Honduras; on the east and southeast by British Honduras, the Gulf of Amatique, Honduras, and Salvador; on the south and southwest by the Pacific Ocean; and on the west by Mexico. Its area is estimated at 47,810 or 48,290 square miles; its territory extending from lat. 13° 42' to 17° 49' N., and from lon. 88° 10' to 92° 30' W.

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Political Divisions.—Guatemala is divided into 22 departments, and each department subdivided into municipal districts, the total number of the latter being 331. Again, for electoral purposes, the whole republic is divided into 38 *distritos electorales*. The following list of the departments and chief towns shows the population and altitude of the latter. The figures given for the number of inhabitants are those of 1903 in the case of Guatemala City, Cobán, and Tonicapam; otherwise the statement is based upon a table carefully prepared in 1897.

Northern departments are: Baja Verapaz (chief town Salamá, population 10,608, altitude 2,827 feet); Alta Verapaz (chief town Cobán, population 24,475, altitude 4,047 feet); El Petén (chief town Flores, population 1,671, altitude 482 feet); El Quiché (chief town Santa Cruz, population 11,914, altitude 5,543 feet); and Izabal (chief town Livingston, population 1,978).

Central departments are: Guatemala (chief town Guatemala City, population 72,102, altitude 4,854 feet); Sacatepéquez (chief town Antigua, or Antigua Guatemala, population 10,150, altitude 4,464 feet); and Chimaltenango (chief town Chimaltenango, population 3,749, altitude 5,666 feet).

Eastern departments are: Jutiapa (chief town Jutiapa, population 11,023, altitude 2,847 feet); Jalapa (chief town Jalapa, population 12,246, altitude 4,625 feet); Chiquimula (chief town Chiquimula, population 12,562, altitude 1,167 feet); and Zacapa (chief town Zacapa, population 11,964, altitude 511 feet).

Southern departments are: Escuintla (chief town Escuintla, population 12,343, altitude 1,269 feet); Amatitlán (chief town Amatitlán,* population 8,408, altitude 3,614 feet); and Santa Rosa (chief town Cuajiniquilapa, population 3,062, altitude 3,254 feet).

Western departments are: Huehuetenango (chief town Huehuetenango, population 10,279, altitude 7,118 feet); Totonicapam (chief town Totonicapam, population 25,196, altitude 7,967 feet); San Marcos, chief town San Marcos,* population 6,036, altitude 7,216 feet); Quezaltenango (chief town Quezaltenango,* population 22,265, altitude 7,419 feet); Retalhuleu (chief town Retalhuleu, population 6,327, altitude 977 feet); Suchitepequez (chief town Mazatenango,* population 6,970, altitude 1,095 feet); and Sololá (chief town Sololá,* population 7,627, altitude 5,940 feet).

The Capital.—Guatemala City, or New Guatemala, which was built after the destruction of Antigua Guatemala in 1776, has a temperate climate, owing to its elevation above the level of the sea. It is a well-planned town, covering a large area; the streets are wide and straight, lighted by electricity, and have lines of street railways. Principal buildings: the palace of the president, city hall, court-house, post and telegraph office, artillery barracks, custom-house, liquor and tobacco bureau, national theatre, college of medicine and pharmacy, university, school of arts and trades, polytechnic school, palace of the archbishop, the cathedral and several other fine churches, the penitentiary, and the hotels. The city has public gardens, telephone

and telegraph service, and is connected by rail with the port of San José. Pop. (1910) 100,000.

Topography and Physical Geography.—The mountains of Guatemala are commonly referred to as "Cordillera of the Andes," "Guatemalan Andes," or simply "Andes," though there is no propriety in those names. The Andes terminate in northern Colombia, and have no genetic connection with the mountains of Central America. In order to understand the independent character of the latter (so far as the great continental ranges are concerned), we must realize that they are also in their geologic history totally distinct from the Rocky Mountain system, or North American Cordilleras, which terminate in southern Mexico. If the trends of the Andean and Rocky Mountain systems were protracted from their termini (in 70° W. and 97° W., respectively), they would not connect with each other, but would pass the latitude of Guatemala in parallel lines nearly 2,000 miles apart. (See CARIBBEAN SEA; CENTRAL AMERICA; and consult: Hill, 'Cuba and Porto Rico,' Chap. I.). The Guatemalan mountains belong to the Antillean system, which lies between the termini just referred to; its ranges, composed of folded sedimentaries, in eastern Guatemala have an east-and-west trend. But the ranges near the Pacific coast of the republic, crossing the western ends of the Antillean corrugations diagonally, or with a northwest-and-southeast trend, must be assigned to still another class; they form a part of the volcanic chain which extends along the entire western coast of Central America, and is continued in Mexico. The Sierra Madre is the principal range of the west and south; in the central and eastern districts are the Sierra de Chama, Sierra de las Minas, Sierra de Santa Cruz, and the Sierra de Copán—the last named on the frontier of Honduras. The highest points of the Cordillera are given as: Tajumulco volcano (12,600 feet), Tacaná volcano (12,400 feet), both in the southwest; Acatenango volcano (11,100 feet), south-central; and the volcano de Fuego (11,400 feet), also south-central.

Hydrography.—Rivers emptying into the Gulf of Mexico are: the Usumacinta, on the Mexican frontier, and the Cuicla and Salequa, which are also tributaries of Mexican streams. The following empty either into the Gulf of Honduras or Izabal Lake (Golfo Dulce): the Montagua, Rio Hondo, the Dulce, the Belice, the Sarstoon, and the Polochic. Those which flow into the Pacific are: Rio de los Esclavos, Rio de Paz, the Michatoya, Guacalate, Coyelate, Patulul, Nagualate, Samalá, Tilapa, Naranjo, and Suchiate. Steamship navigation has been established on the Dulce and Polochic rivers; seven or eight of the others are navigable for small boats. The most important lakes are: Atitlán and Izabal (both navigated by steamers), Petén, Amatitlán, Ayarza, and Güija (on the frontier of Salvador). Ports on the Caribbean side of the republic are: Puerto Barrios, Livingston, and Santo Tomás—the first two being ports of entry and delivery, while the last is a "minor port," at which importation and exportation are restricted to certain articles. On the Pacific coast the most important ports are: San José, 74½ miles from Guatemala City; Champerico, and Ocós—all ports of entry and delivery, provided with iron piers, etc.

Geology.—The calcareous formations of the Antillean ridges and, generally, the eastern and

*Towns damaged or destroyed by earthquakes in 1902.

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central regions, deserve special mention. Volcanic products characterize the Pacific slope and Sierra Madre, where they occur in connection with granitic rocks, porphyries and trachytes. See also CENTRAL AMERICA.

Mineral Resources.—Gold and silver are found near the Montagua River and elsewhere; salt in the departments of Alta Verapaz and Santa Rosa. Other minerals reported to exist are: coal, lignite, manganese, lead, tin, cinnabar, copper, kaolin, opals, slate, alum, antimony, marble, alabaster, sulphur, ochre, asbestos, plumbago, chalk, and bitumen. A belt of country extending from the coast range of mountains on the western frontier, near the Pacific, across the Sierra Madre to the coast range of the Caribbean slope, is regarded as essentially a mineral territory, in which there has been comparatively little exploiting or prospecting, though enough to reveal the presence of the precious and base metals.

Climate.—The lowlands of the Pacific and Atlantic coasts are torrid; interior table-lands, at an altitude of 2,000 to 5,000 feet, have an agreeable climate; and the high districts, where the elevation is more than 5,000 feet, are decidedly cool. As is shown in the list of places given under "Political Divisions," the larger towns are built in the temperate or cool zones. The rainy season, beginning in May, lasts until October in the interior, but sometimes until December, on the coast. December and January are the coldest months; March and April the hottest. Snow sometimes falls (in December or January) on the uplands of the cool zone.

Flora and Fauna.—The very name of the country signified in the Indian language "the land covered with trees." The rich soil and varying climatic conditions favor a wide range of products in the vegetable kingdom; no systematic classification of these, however, has yet been made. The extent of the forest land, which abounds in mahogany, is estimated at 1,300,000 acres. The fauna and avifauna resemble those of Costa Rica in general, but especially characteristic of Guatemala are the aquatic birds on its rivers and lakes, and the quetzal. Mexican deer are quite numerous. The tapir, honey-bear, armadillo, wild pig, cougar, jagua, etc., are found as in other parts of Central America. The over-abundance of insect life is particularly noteworthy.

Land Tenure.—The most interesting provisions of the Guatemalan laws, to be considered under this heading, are those which relate either to the public lands or more particularly to the aid which the government desired to extend to the cultivators of certain crops. The latter will be stated in the paragraph entitled *Agriculture*. As for the former, the agrarian law of 1894 provided for the sale, lease, and gratuitous concession of the public lands, and created a board of government engineers to survey the said lands and divide them into lots of not more than 15 caballerias each. (One caballeria in Guatemala = 113½ acres.) These lots can be purchased from the government at prices ranging from \$250 to \$500 per caballeria, but no alien is allowed to hold lands situated on the frontier of the republic; or they may be leased (under certain restrictions as to area, duration of lease, and use of the lands) at a rental not to exceed 5 per cent of the selling price; or they may be granted by the president of the republic, in

tracts not larger than two caballerias each, to poor persons applying for them, to immigrants, to educational institutions, as a reward for the construction of new roads, etc. Real estate, the value of which does not exceed \$1,000, is exempted from taxation. Transfers of unimproved city lots, or of real estate in the country the price of which does not exceed \$100, cannot be taxed; and no foreigner can be required, during the first year of residence in the country, to contribute money or personal service for making or repairing roads.

Agriculture.—Coffee grows in the regions between 1,000 and 6,000 feet above the sea-level; sugarcane, between sea-level and 6,200 feet; cacao in the lowlands or those regions having an altitude of less than 3,000 feet. Tobacco, wheat, maize, and beans, are also produced in large quantities. Coffee exports in one year have amounted to 85,373,223 pounds, with a value of \$7,390,477 gold. The ordinary annual yield of tobacco is given as 1,000,000 pounds; of cane-sugar, 41,000,000 pounds; bananas, 1,000,000 bunches; and cacao, 200,000 pounds. Stock-raising has been encouraged in the departments of Izabal, Zacapa, Petén, and Alta Verapaz, by decrees authorizing the political chiefs of those departments to make grants of land to persons who establish ranches. Money premiums have been offered to cultivators of india rubber, cacao, sarsaparilla, and hemp; grants of land to those who engage in the cultivation of wheat and bananas. Proprietors of large cotton or tobacco plantations, and reliable day laborers on large plantations of coffee, sugarcane, bananas, or cacao, are exempted from military service. No tax of any kind is levied for 10 years upon plantations of hemp, flax, ramie, cotton, grapes, and one or two other products. Large cash premiums to encourage the production of grapes, hemp, cotton, flax, wheat, and tobacco were offered, particularly during the decade 1886-96; in 1899 the government offered 113½ acres of the public lands as a reward for every 20,000 rubber-plants, four years old, planted after 14 Jan. 1899.

Commerce.—Exports to the United States in the year 1908 were valued at \$1,776,676; imports from the United States footed up to a total of \$1,718,660. The principal exports for 1908 were: Coffee, to value of \$5,697,183, sent to Germany, the United States, and Great Britain; sugar, with value of \$186,788, sent to other Central American countries and to the United States; bananas, over \$200,000, sent to the United States; hides and skins, \$291,283, sent to Germany and the United States; india rubber, amounting to \$158,373, sent to the United States and Germany; native woods \$144,349, sent to Great Britain and the United States; and other articles valued at \$76,690. Of the imports, about one third in value are supplied by the United States, and one fifth by Great Britain, the chief imports being flour, cotton goods, machinery and manufactured iron, and preserved meats and other articles for food. The total value of imports in 1909 was \$5,251,317; of exports, \$15,330,536.

Manufactures.—For the partial supply of local needs a number of small establishments are maintained, the chief industries being the preparation of ramie fibre and the manufacture of coarse textiles, hats, shoes, pottery, cigars,

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foundry products, musical instruments, furniture, agricultural implements, and liquors.

Shipping and Navigation.—Steamers of the Pacific Mail Steamship Company call at San José three times each month on the voyages from San Francisco southward. From New York to Puerto Barrios (via Haiti and Jamaica) passengers and freight are carried by two steamship lines. The steamers of the American Fruit Company ply between New Orleans and Puerto Barrios; and the valuable addition was made of a new steamship service, the "Guatemala Northern Steamship Line," to operate chiefly between ports on the gulf coast of the United States and Puerto Barrios.

Railways, Roads, Telegraph, etc.—The Central Railway, the first line built in the republic, was completed in 1882. It connects the port of San José with Guatemala City. The Champerico Railway runs from the Pacific port of that name to Retalhulen and San Felipe, a distance of 41 miles. The Ocos Railway, 15 miles in length, connects the wharf at Ocos with the town of Ayutla, near the Mexican frontier. The Ixtapa Railway connects Overo with the old port of Ixtapa (12 miles). The Patulul-Mazatenango Railway has as its terminal points Santa Maria station, on the Central, and San Felipe, passing through Patulul and Mazatenango. The Northern Railroad, which now connects Puerto Barrios with Guatemala City (and thus, in conjunction with the Central, supplies railway transportation from coast to coast), has (1909) finished its total length of 195 miles. The total railroad mileage in 1908 was 700 kilometres (435 miles), and new lines are projected or in course of construction. An important highway from Sanarate has been completed, giving access to the northern agricultural districts. The republic had in actual operation in 1908 4,196 miles of telegraph and telephone wires, with over 200 offices and stations and nearly 1,000 employees. In 1909 there were 192 post-offices in the country.

Weights, Measures, and Money.—The French metric system is used, concurrently with the old Spanish system of weights and measures. The latter has: *Onza* (ounce), *libra* (pound, strictly 1.043 pounds), *arroba* (25 *libras*), *quintal* (100 *libras*), *tonelada* (ton 20 *quintals*), and *fanega* (1½ bushels). The monetary unit is the silver *peso* (value in United States gold or silver, \$0.384). The money in actual use is paper currency and fractional nickel coins.

Banking.—Six banks are authorized to issue paper, namely: International Bank of Guatemala (Banco Internacional de Guatemala), Colombian Bank (Banco Colombiano), Western Bank (Banco de Occidente), Commercial Bank of Guatemala (Banco Comercial de Guatemala), American Bank (Banco Americano), Guatemala Bank (Banco de Guatemala). All of these, except the Banco de Occidente, have their headquarters in Guatemala City.

Government.—The legislative power is vested in the National Assembly (a single house), whose members (deputies) number one for every 20,000 inhabitants, and are elected for four years by popular vote. The executive power is vested in a president, elected for six years by direct vote of the people. He is responsible for his acts to the assembly, and cannot be re-elected until after an interval of at least one term. The administration is carried on, under the president,

by six "secretaries of state," each of whom has charge of a separate department (*ministerio*). These departments are: Government and Justice, Foreign Relations, Public Instruction, Promotion of Public Welfare (*Fomento*), Finance and Public Credit, and War. The council of state is an advisory board, of which certain members are chosen for the assembly and others appointed by the president.

Finances.—The national revenue in 1901 is shown in the following table:

Customs	\$8,513,260.88	
Expenditure	7,855.85	\$8,505,405.03
Liquor excise and government monopolies	\$3,775,892.98	
Expenditure	117,687.15	\$3,658,205.83
Taxes	\$1,651,246.55	
Expenditure	72,588.45	\$1,578,657.10
Total		\$13,742,268.96
Deficit from post-office	\$110,617.48	
Deficit from telegraph office	193,541.32	\$304,158.80
Net total		\$13,438,110.16
Revenue in 1900		7,974,435.40
Increase in revenue		\$ 5,463,674.76

The sum of \$14,547,246.72 was appropriated for administrative expenses in the fiscal year extending from 1 July 1902 to 30 June 1903, with the following distribution: Government and justice, \$1,874,392; foreign relations, \$256,180; treasury, \$1,199,986; public credit, \$6,000,000; development, \$1,458,279; war, \$2,006,154.40; public instruction, \$1,442,900; other expenditures, \$309,376.32. The revenue for the year was estimated at \$14,555,000. The total amount of the foreign debt liquidated to 30 June 1902, according to an official statement, was:

Principal on 30 June 1898	\$7,216,046
Half of interest from 1898 to 1901, convertible in bonds	432,963
Half of interest to 30 June 1901	288,642
Interest for 1901 to 1902	288,642
Total	\$8,226,293

For the year 1909 the total of revenues was \$2,954,383; of expenditures, \$4,233,255. The American syndicate debt in 1908 was \$2,913,744.

Army.—The army consists of about 7,000 men in regular service; effective army, 56,900 men between the ages of 18 and 30; reserve, 30,000 men from 30 to 50 years of age.

Population.—Full-blooded Indians are much more numerous in Guatemala than in other Central American countries; in fact they, with the Indians of mixed blood, *ladinos* and *mestizos*, make up the bulk of the population. The natural increase among these people is indicated in the report of the secretary of public works for 1901, which shows 66,728 births in that year against 35,618 deaths, a gain of 31,110 persons. The total number of inhabitants in 1910 was about 1,992,000, including 11,000-12,000 foreigners.

Education.—Public instruction, supported by the government, is secular and gratuitous; primary instruction is obligatory; free education is guaranteed by the Constitution. In 1908 there were 1,330 schools, attended by 51,280 pupils—a year's gain of 68 schools and 780 pupils. In Guatemala City there were 53 schools, of which number 25 were public.

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under government inspection; and among the private institutions was a school for boys and girls of the German colony only, endowed by the German government. Higher instruction was given in the capital at the National Institutes (one for men and one for young women), to which normal departments were attached; and similar institutes existed at Quezaltenango (before its destruction) and Chiquimula. There is a separate normal school for young women at Guatemala City, and normal schools for young men at Antigua, San Marcos, and Mazatenango. Schools of law, medicine, and engineering are mainly supported by private funds, but receive aid from the public treasury. Education in music is supplied at the National Conservatory and a number of local schools. There are also trade schools (including one for women) a commercial college, and an art school. The national library contains 30,000 volumes and many valuable unpublished documents. Other libraries accessible to the public are those of the professional schools, the supreme court, national institute for men, and academy of teachers. Public libraries are maintained in the larger towns. The national printing-office at the capital is regarded as one of the best establishments of its kind in Latin-America. More than 30 daily papers and other periodicals are published in the country.

Religion.—The Constitution guarantees liberty of conscience. The government recognizes no creed. The prevailing religion is Roman Catholicism.

Judiciary.—The supreme court of justice consists of a chief justice and four associates, elected by the people. There are six courts of appeal, each consisting of a chief justice and two associates, also elected by the people. Courts of the first instance are 29 in number: their judges are selected by the president among the candidates approved by the chief justice of the supreme court.

Local Government.—The "Political Chief" (*Jefe Político*) of each department of the republic is appointed by the president, whose authority he exercises in provincial matters. The local officials locally elected are: the *Alcaldes* (one or more for each municipal district) and the *Regidores* (members of the municipal council). *Alcalde* and *Regidor* correspond to mayor and alderman; the *jefe político* takes the place of a governor, and his relation to the chief executive in a centralized republic fairly indicates the limits within which local self-government is permitted.

History.—Pedro de Alvarado, one of the lieutenants of Cortés, in 1523-4 conquered the country, and on 25 July 1524 proclaimed the sovereignty of Spain at Almolonga, the native town which was afterward to be known as Santiago de los Caballeros. The important fact in connection with this conquest is that it did not lead to the extermination of the natives. Two explanations of this circumstance are offered. Mr. Bancroft says that the Indians, after fighting desperately in defense of their homes, maintained a sullen resistance, and therefore both here and in the adjoining state of Chiapas "the natives probably retain to the present day their original traits with fewer modifications than elsewhere in the Pacific States." But this theory is at variance with the Central American records in general. A

suggestion which may be preferred is that the natives of Guatemala were essentially peace-loving agriculturists, not uninfluenced by that civilization which had survived here, as in southern Mexico and Honduras, from very ancient times; that they were allowed to remain undisturbed after the first resistance ceased, while the more warlike tribes, such as those inhabiting Costa Rica and Veragua, were gradually being exterminated. And their descendants in great numbers still possess the land. After the conquest all of the territory now divided up among the Central American countries was included in the captain-generalcy of Guatemala. Independence was proclaimed 15 Sept. 1821; annexation to the Mexican empire under Iturbide followed (5 Jan. 1822). An assembly of representative citizens of Guatemala and the other Central American provinces on 1 July 1823 declared the whole country to be independent, with reference to Mexico, Spain, and all other nations, "whether of the Old or of the New World." Accordingly the United Provinces of Central America came into existence. Guatemala seceded from this union 17 April 1839. The name República de Guatemala was assumed 21 March 1847. Between 1839 and 1851 there was a series of bitter struggles with Salvador for supremacy, fortune favoring the smaller republic; but in the year last mentioned Guatemala began to be successful, and, under the leadership of Rafael Carrera (president until 1856, and subsequently life-president or dictator), carried the war into Salvador (1863) and regained the controlling position in Central America. Carrera appointed his own successor, and died in 1865. The next significant administration was that of Gen. Justo Rufino Barrios, who was put in office by the Liberals, after their onslaught upon the Jesuits. Barillas was elected to the presidency in 1886. In 1890 and 1891 the progress of the country was checked by epidemics of cholera and smallpox. On 15 March 1892 José Maria Reina Barrios was inaugurated as president, and by a decree of the National Assembly (30 Aug. 1897) his term was extended to 15 March 1902—in direct violation of the Constitution, which was proclaimed in 1879 and modified in 1885, 1887, and 1889. He was assassinated 8 Feb. 1898 by a British subject of German origin. Dr. Manuel Estrada Cabrera was proclaimed acting president, and received the support of the army. An insurrection begun under Gen. Castillo's leadership 28 July was put down, but only to be quickly followed by another revolutionary movement. Insurgent forces commanded by Morales offered a stubborn resistance in the southwest, until Morales was captured. When peace had been restored, Cabrera was the only candidate for the presidency, and his election was announced 25 Sept. 1898. In the following year the government of Guatemala made a proposition which was equivalent to repudiation of a part of its foreign debt, but yielded to Germany's protest—or threat to use force—and withdrew the discreditable suggestion. Earthquakes which occurred in April 1902 caused great damage in several districts. Amatitlan, Mazatenango, San Marcos, Sololá, and San Felipe suffered severely, and Quezaltenango, in importance the second city of the republic, was totally destroyed. An eruption of the volcano Santa Maria followed on 24 October, and there were outbursts from new

craters in November. Several thousand persons lost their lives through these disasters, and the injury to property (plantations, buildings, machinery, and cattle) has been estimated at \$5,000,000 to \$10,000,000. Taxes for the relief of the earthquake sufferers were imposed by the Legislative Assembly 24 April 1902. A convention between the United States and Guatemala relating to the tenure and disposition of real and personal property was signed 27 Aug. 1901, and ratifications exchanged at Guatemala 16 Sept. 1902.

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MARRION WILCOX,

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Guava, gwā'vā, the name of several tropical plants of the myrtle family which yield delicious fruits. The common guava (*Psidium guava*, or *pyriferum*) is a low bushy tree, bearing long, fragrant white flowers on solitary axillary stalks, from each of which develops a fruit larger than a hen's egg, roundish or pear-shaped, smooth, yellow; the rind thin and brittle; the pulp firm, full of bony seeds, aromatic, and sweet. The jelly or preserve made from it is highly esteemed, and pleasantly mingles tartness with sweetness. The rind is stewed with milk, and is also made into marmalade. This fruit is rather astringent than laxative. Guava buds, boiled with barley and licorice, make a useful astringent drink in diarrhoea. This guava is now naturalized in all the warmer parts of the world, and in many, especially Ceylon, has run wild. Two cultivated varieties are known, the preferable "white," and the more showy but less agreeable "red." Several other species are cultivated; as the mountain guava of the West Indies (*P. montanum*) and the marangaba, a dwarf species (*P. pygmaum*) of Brazil, with fruit no larger than gooseberries.

Guaviare, gwā-vē-ā'rā, or **Guayabero**, gwī-ā-bā'rō, a river of Colombia, South America, which rises in the Cordillera Oriental near Bogota, flows eastward for 750 miles, forms the boundary between the departments of Cundinamarca and Cauca, and joins the Orinoco near San Fernando de Otabapo. It is navigable for nearly five hundred miles.

Guayama, gwī-ā'mā, Porto Rico, town in the southeastern part of the department of Guayama; five miles from the sea. Pop. 5,400.

Guayaquil, gwī-ā-kēl', Ecuador, a seaport city, the capital of the province of Guayas, on the river Guayaquil, 25 miles above its mouth in the Gulf of Guayaquil, on the Pacific Ocean. The site is low and unhealthy, but the sanitary conditions have been improved by a modern system of waterworks, and of drainage. Other modern improvements include street railways, gas-lighting, and telephone service, while a railroad connects with the interior. The chief buildings are the custom-house, town-hall, a college, technical school, and the cathedral. Vessels of

18 feet draught reach the town, and the river and its tributary, the Daule, are navigable for smaller vessels, a considerable distance above the town. The export trade averages \$6,500,000 annually, cocoa representing nearly five-sixths, the rest being, coffee, ivory-nuts, rubber, hides, and specie. Cottons, hardware, and other manufactured articles are imported. The industrial establishments include steam saw-mills, foundries, machine-shops, ice factories, and a large brewery. The town was founded 25 July 1531 on St. James' day, whence its official title Santiago de Guayaquil. It has had an eventful history, being attacked by pirates, Dutch, French and English, and suffering from disastrous conflagrations, on the last occasion in 1896. Pop. about 55,000.

Guayaquil, a gulf of the Pacific, in the republic of Ecuador. It has a wide entrance, narrowing as it extends inland, and receiving at its head the Guayaquil River. It contains a number of islands.

Guaymas, gwī'mās, Mexico, city in the state of Sonora; on the Gulf of California, the terminus of the Sonora Railroad, and the chief Pacific port of Mexico. The principal exports are gold, silver, and hides. Pop. 6,100.

Guayrá (gwī-rā') **Falls**, Brazil and Paraguay, a cascade of the Paraná River, on the boundary between the countries mentioned; the result of a contraction of the river-bed from a width of 4,470 yards into a narrow gorge, 65 yards wide, the waters making a plunge of 56 feet. "These falls, situated in the midst of a desolate region, far from human habitation, and rendered almost inaccessible by virgin forests, rapids, and other obstacles, have been visited by very few, though they are said to form one of the grandest spectacles in the world. The volume of water which passes over them is twice that of Niagara." Consult 'Paraguay' (2d ed. revised by J. S. Decoud, Honorary Corresponding Member of the International Union of American Republics; Washington: Government Printing Office, 1902).

Gubat, goo'bāt, Philippines, a pueblo of the province of Sorsogón, Luzon, on the east coast of the Bay of Gubat, 11 miles southeast of the provincial capital Sorsogón. The waters of the bay were formerly infested by pirates, who terrorized the surrounding region. Pop. 13,300.

Gubernatis, Angelo de, ān'jā-lō dā goo-bēr-nā'tēs, Italian Orientalist: b. Turin 7 April 1840. He founded the Italian Asiatic Society in 1886 and has written much in various departments. Among his works are 'The First Twenty Hymns of the Rig-Veda' (1865); 'Death of Cato' (1863), a metrical drama; 'King Nala,' an Indo-Brahmin play; 'Gabriel,' a novel; 'Zoological Mythology' (1872); and 'Dictionnaire International des Ecrivains du Jour.'

Gudgeon, gūj'ōn, a small European freshwater fish (*Gobio fluviatilis*) of the carp family. It swims in shoals, and affords great sport to anglers from its greediness in seizing upon any bait presented. Its name has therefore come to mean a person easily "fooled" to his hurt.

Gudrun, goo-droon', or **Kudrun**, an old German epic, built up out of the popular songs and traditions of the seafaring people who lived

on the shores of the North Sea between the Elbe and the Seine. It was put into permanent form by an unknown poet of Austria in the latter part of the 12th or early 13th century; and ranks second to the 'Nibelungenlied' in the history of early German literature. It relates the history of three generations of the kings of the Hegelings or Frisians, and in the third part tells how Gudrun, the daughter of Hetel, king of the Hegelings, was carried off from her home by Hochmut, son of the king of Normandy; how she preferred to work like the lowest maidservant in the house of Hochmut's mother, and endure the greatest indignities, rather than break her troth pledged to Herwig, king of Zealand, and how finally she was rescued by her brother and her betrothed.

Guebers, gē'bērz, also **Ghebers**, **Gabers**, **Ghavers**, **Geburs** (Turkish Ghaur or Ghiaur, infidel, generally but probably wrongly derived from the Arabic *kāfir*), a name applied by Mohammedans to the adherents of the ancient religion of Zoroaster, who reside in Persia. They originally were subjected by the Mohammedans to much cruelty, but are now permitted a great degree of religious freedom. Those who fled to India are known as Parsis (q.v.).

Guelder (gē'dēr) **Rose**, or **Snowball**, a cultivated variety of the *Viburnum opulus*, or water elder, of the order *Caprifoliaceae*. In the European wild form, the inflorescence is a dense cyme whose outer flowers are barren and enlarged, but in the cultivated form all the flowers are neuter and consequently the plant can never set seed. A yellow dye is obtained from it, and the wood is sometimes employed in making tobacco-pipes and other articles.

Guelders, gē'dērz, or **Guelderland**. See **GELDERLAND**; **NETHERLANDS**.

Guelfs, gwēlfs, or **Guelphs**, and **Ghibellines**, names of rival political parties in Italy during the Middle Ages. The words are of German origin, derived respectively from *Welf*, the name of a princely family in Bavaria (from which is descended the royal Brunswick line and the line of Este), and *Waiblingen*, the name of a castle in Württemberg belonging to Conrad of Hohenstaufen, the German emperor. In the great battle of Weinsberg, 1140, the war-cry of the partisans of Conrad was "Hie Waiblingen," that of the adherents of the Duke of Saxony (of the house of Welf) was "Hie Welf." Some years after when the effort was made by the popes and various states and princely houses of Italy, among them the house of Este, to consolidate opposition to the Emperor, the two German words, changed to *Guelfo*, *Guelfi* (plus), and *Ghibellino*, *Ghibellini*, were adopted as party designations by the Italians. At first and for a long time after the assumption of these names by the great parties in Italy, *Guelf* and *Ghibelline*, did really designate two opposing national policies—the policy of the dependence of the several states of the Peninsula on the Empire, and the policy of Italian independence of Germany, and of resistance to imperial absolutism. The states of northern and of central Italy were divided in their allegiance and they were continually passing from one side to the other, but they were predominantly *Ghibelline*; the states of southern Italy were always *Guelf*. The popes were the mainstay of the *Guelf* party and thus

were the assertors of the policy of Italian independence and home rule. As usual with party designations, "*Guelf*" and "*Ghibelline*" continued in use as the names of factions in no wise concerned with the question of imperialism.

Guell y Rente, **Jose**, hō-sā' goo-ely' ē rān-tā', Cuban author: b. Havana, Cuba, 14 Sept. 1818; d. Madrid 20 Dec. 1884. He studied law in Havana and Barcelona and practised his profession in his native city. In 1848 he went to Spain where he married Josepha de Bourbon, sister of the king. Besides several novels he published 'Philippe II. et Don Carlos devant l'histoire' (1878), and other works.

Guelph, gwēlf, Canada, city and county-seat of Wellington County, Ontario; on the river Speed, and on the Grand T. and Canadian P. Rys., 48 miles west of Toronto; founded by John Galt (q.v.). The river affords abundant water power and the city, in a rich agricultural and cattle-raising district, enjoys a large trade. It is an inland port of entry and is the seat of a United States consulate. It has breweries, large flour, saw, and planing-mills, and manufacturing of foundry products, machinery, pipe and tubing, musical instruments, sewing-machines, agricultural implements, woolen goods, carpets, furniture, carriages, leather, soap, boots and shoes, etc. Good building stone is quarried in the vicinity. Guelph has in addition to the county buildings, 4 colleges, 16 churches, substantial business blocks, banks, a library and reading-room, and daily and weekly newspapers. The city owns and operates its electric light, gas and power, its water-works and street railway. It is the seat of the Ontario Agricultural College (q.v.) and the Provincial Experimental Farm.

Guelphs, **Order of**, frequently styled the **Guelphic Order**, an order of knighthood instituted for the kingdom of Hanover in 1815 by the prince-regent of England and Hanover, afterward George IV. of England, and conferred by the kings of Hanover until the absorption of that kingdom by Prussia in 1866.

Guemal, gwā'māl, either of two species of small Andean deer (*Cervus chilensis* or *C. antiscensis*), whose antlers have only one forking—a long brow-tine projecting straight forward; which have tusks in the upper jaws in both sexes; and whose fawns are not spotted.

Guerber, **Helene Adeline**, American author. Her books include: 'Empresses of France'; 'Legends of the Middle Ages'; 'Legends of the Rhine'; 'Myths of Greece and Rome'; 'Myths of Northern Lands'; 'Story of the Thirteen Colonies'; 'Story of the Great Republic'; 'Story of the Greeks,' etc., etc.

Guercino da Cento, gwēr-chē'nō dā chēn'-tō, Italian painter: b. Cento, duchy of Ferrara, 1590; d. Bologna 1666. His proper name was GIOVANNI FRANCESCO BARBIERI, and he was called Guercino from a squint in his eyes. In 1621, having already acquired renown as a painter, he was invited by Pope Gregory XV. to Rome, but the premature death of this pontiff induced him to return to his native town two years after. About 1642 he went to Bologna, where Count Aldovrandi received him in his palace and entertained him with the most magnificent hospitality. Guercino adopted three different manners of painting, the first in imitation of Caravaggio, which being very dark, he

quitted for that of the Caraccis, and latterly for a style still more light and sketchy; but his middle style is his best. His chief pictures are at Rome. The most celebrated is that of the 'Martyrdom of Saint Petronilla,' which has been copied in mosaic to adorn one of the panels in Saint Peter's between the 'Transfiguration' by Raphael, and the 'Communion of St. Jerome,' by Domenichino. His other chief pictures include a 'St. Anthony' at Padua; an 'Annunciation' at Milan; 'St. Peter' at Modena; 'Cephalus and Procris,' and a scene from the 'Pastor Fido' in the Dresden gallery; the 'Parting of Priam and Hector' at Marseilles. The galleries of Bologna, Florence, and Paris, besides some of those of England and Germany, also possess specimens of this master.

Guereza, gër'è-zà, or **Guerza**, gër'zà, (*Colobus guereza*), an Abyssinian monkey remarkable for its beauty. Short, glossy, jet-black fur covers its limbs, back and head, while a long fringe of silky white hair depends from the flanks. It frequents lofty trees and is much sought for the sake of its valuable fur.

Guérin, Eugénie de, è-zhâ-nè de gâ-rân, French writer: b. Cayla, Languedoc, 1805; d. 31 May 1848. She was a sister of G. M. Guérin (q.v.) and much of her life was devoted to taking care of him. Her 'Journals and Letters,' of which an English translation appeared (1865-6), have been widely read in America, both for their charm of style and their devotional spirit. See Parr, 'Maurice and Eugénie de Guérin' (1870).

Guérin, Georges Maurice, zhörzh mô-rës, French poet: b. Languedoc 4 Aug. 1810; d. Paris, 19 July 1839. He was for a time a member of a religious house in Brittany, but in 1833 went to Paris and taught in the Collège Stanislas. His verse has been greatly admired by critical readers. Sainte Beuve in 1860 edited his 'Reliquæ' with critical notice, and the poet forms the subject also of one of Matthew Arnold's 'Essays in Criticism' (1865). See Parr, 'Maurice and Eugénie de Guérin' (1870).

Guernsey, gër'n'zi, Alfred Hudson, American editor: b. Vermont, 1825; d. 17 Jan. 1902. He was for several years editor of 'Harper's Magazine,' and he was also associate editor of the 'American Cyclopædia' (1872-6). With Henry M. Alden he was author of 'Harper's Pictorial History of the Great Rebellion,' writing the Eastern campaigns (1862-5); and 'The Spanish Armada' (1882).

Guernsey, Egbert, American physician: b. Litchfield, Conn., 8 July 1823; d. Fishkill Landing, N. Y., 19 Sept. 1903. He was graduated from the medical department of New York University in 1846, founded the Brooklyn *Daily Times*, and in 1872 became editor of the 'Medical Times.' He was also president for many years of the Metropolitan Hospital of New York, and published 'Domestic Practice' (1855), which has passed through 11 editions.

Guernsey, the second largest and westernmost of the Channel Islands (q.v.), 46 miles southwest of Cherbourg, France, and 68 miles from Start Point, Devonshire, England. It is triangular in form, nine miles long and from three to four miles broad. The picturesque south coast is lofty and abrupt, the island slop-

ing towards the north which is low and level. Guernsey is noted for its healthful climate, for the fertility of its soil, for its horticultural and floricultural products grown chiefly under glass, and for its magnificent breed of cattle. The chief towns are St. Peter Port (q.v.), the capital, and Saint Sampson, the latter with an important export trade in blue granite. With the adjacent islands of Sark, Alderney, Herm and Jethow, Guernsey forms an autonomous bailiwick.

Guerrero, Teodoro, tã-ô-dô'rô gër-rã'rô, Cuban dramatist: b. Havana 9 Nov. 1824. He was educated in Spain, returning to Cuba in 1845, in which year his first volume of poems, 'Teodorelas,' was published. His comedy, 'La Cabeza y el Corazón' ('The Head and the Heart'), was successfully performed at Havana in 1861, and 'Lecciones do Mundo' ('The Lessons of the World'), didactic verse, reached many editions. The author published other dramas and several works of fiction and was active in Cuban educational affairs.

Guerrero, Mexico, a state bounded by the states of Morelos and Mexico on the north, Puebla on the northeast, Oaxaca on the east and southeast, and by the Pacific Ocean on the southwest. Its area is given as 64,756 square kilometres, or 24,926 square miles. It is mountainous throughout almost its entire extent, the northern section being occupied by the spurs of the ranges of Morelos and Mexico, and the southern by the Sierra Madre del Sur (highest peaks 2,800 metres). Between these two sections runs the Mexcala or Balsas River, to which all the streams of the state are tributary. The principal lakes are Pazahuaco, Chantengo, San Marcos, and Nexpa. The Pacific coast line is low and sandy, and has excellent harbors. The bay of Acapulco, the chief port, is deep and spacious. The mineral resources of the state have been as yet very imperfectly developed. Gold, silver, lead, mercury, iron, coal, sulphur, marble, granite, opals, topazes, and diamonds are mentioned among its products. The climate is unhealthy. On the coast the heat (from 95° to 96.80° F.) and rainfall are both excessive; and in the belt above 6,500 feet, the cold is sometimes severe. Fevers, leprosy and affections of the respiratory and digestive organs are the prevailing diseases. The annual value of the agricultural products is about \$2,200,000, and the total value of live stock is estimated at \$3,000,000. Manufactures are limited to sugar-cane products, mescal wine, palm-oil, cotton fabrics, and leather. Plans for a number of railways have been made, but have not been carried out. There are, however, telegraph and telephone lines, and a few wagon roads. Steamers of the Pacific Mail and the Mexican International Company touch at Acapulco. The state is divided into 14 districts: La Unión, Mina, Alarcón, Hidalgo, Alvarez, Zaragoza, Morelos, Abasolo, Allende, Tabares (chief town Acapulco de Juarez, with population of 5,780), Galeana, Chilpancingo (principal town and capital of the state Chilpancingo de los Bravos, with population of 6,321), and Guerrero. Total population of the state 420,336.

Guerrilla, gë-ríl'la, an irregular mode of carrying on war by means of small independent bands of armed men, self-constituted and un-

connected with the regular army. The name originated in the Spanish war for independence (1808-14), when the term guerrillas was applied to the bands of Spanish peasants, organized to harass the French armies that then occupied Spain. Guerrilla warfare was carried on to some extent during the Revolution and also in the Civil War, particularly by the Confederates. Guerrilla methods were also effectively used by the Cuban patriots.

Guesclin, Bertrand du. See **DU GUESCLIN.**

Guess, George. See **SEQUOYAH.**

Guest-bees, a large genus (*Nomada*) of little bees of both Europe and America, which lay their eggs in the nests of burrowing bees of the genera *Andrena* and *Halictus*, where the young share the food gathered for the young of their hosts, and the adults live harmoniously together,—apparently a case of partnership rather than of parasitism. Compare Cuckoo-BEE.

Gug'genheimer, Randolph, American lawyer and politician: b. Lynchburg, Va., 20 July 1848; d. Elberon, N. Y., 12 Sept. 1907. He studied at New York University and began his business career as clerk in a woolen goods house in New York. He later entered a law office, studied law, was admitted to the bar, and became the head of a law firm, which was particularly successful in important negotiations with English syndicates, investing capital in American industries. He also was active in the political life of the city as a Democrat; was a member of the board of education for three years; and was also president of the board of aldermen, in which capacity he served as acting mayor of Greater New York.

Guiana, ge-ä'nä, the name applied to all that tract of country in South America bounded by the Atlantic Ocean, the Amazon River and its branches, and the Orinoco River and its branches. It lies between lat. 8° 40' N. and lat. 3° 30' S., between lon. 50° and 60° W. Its greatest extent east and west is 1,090 miles; its greatest breadth, from Punta Barima, to the confluence of Rio Negro with the Amazon, is 710 miles. The total area is more than 800,000 square miles. The western districts belong to Venezuela; the southern and eastern districts to Brazil. The three European colonies, the British, Dutch, and French Guianas, extend from the seacoast to the frontiers of those republics.

Early voyages to this part of South America are mentioned in the article **DISCOVERIES**, etc. The first settlements on the northern coast lay much farther toward the west, and exploration and colonization east of the Orinoco began when European adventurers continued in this new field their search for Eldorado. Spanish and Portuguese expeditions into Guiana during the 16th century were very numerous, but always disastrous. The English undertook its conquest, believing, in the words of Sir Walter Raleigh, "that whatever prince shall possess it, that prince shall be lord of more gold, and of a more beautiful empire, and of more cities and people, than either the king of Spain or the great Turk." Capt. Laurens Keymis, sent by Raleigh in 1596 to explore the region, reported that "the like occasion seldom happeneth in many ages." In the articles, **DABAIBA** and **ELDORADO**, it is shown that the birthplace of the

Eldorado myth was the region now known as Colombia, and that the time of its birth was near the beginning of the 16th century; but in the course of 100 years the site of Eldorado was transferred to central Guiana, and Schomburgk asserts that the possibility of its existence in that locality continued to occupy the imagination and attention of adventurers until the close of the 18th century. Humboldt was the first to prove that a lake "like unto Mare Caspium," as Raleigh described it, no longer existed, and it was erased from the maps; Schomburgk identified the locality where it was sought with the small lake Amucu near an Indian village named Pirara. Raleigh led several armaments from England with the hope of conquering the golden capital. When these undertakings ended in disappointment, Capt. Keymis committed suicide, and Raleigh "paid the forfeit of his illusions with his life upon the scaffold." Dutch traders, who arrived about 1580, settled on the Pomeroon and Essequibo rivers; and after the establishment of the Dutch West India Company land on the Berbice River was granted to van Peere. The Pomeroon colony was abandoned owing to attacks by the English in 1666 and by French privateers. In 1740 English planters from the West Indies established themselves on the Essequibo, as a result of the "open door" policy adopted by the Dutch with respect to that region alone. Next, the overflow of immigration settled in the Demerara district; and in 1781 all three colonies, Essequibo, Demerara, and Berbice, were taken by the British. Recaptured before the year was out by the French (who were then allies of the Netherlands), they were again taken by the British in 1796. The peace of Amiens restored the original status; but English troops interposed once more, and the colonies were ceded to Great Britain by the treaties of 1814-15. They were united in 1831, forming British Guiana.

In the region east of Berbice, a few English people attempted to form a colony at the village of Paramaribo (1626), but abandoned the project. Ten years afterward the French invested Paramaribo, but relinquished it, proceeded to Cayenne, and there founded what is now known as French Guiana. In 1652 a body of English settlers again arrived at the Coma River, and succeeded in establishing themselves. This colony was granted in 1662 by Charles II. to Lord Willoughby, who changed the name Coma River into Surryham, in honor of the Earl of Surrey. Hence we have "Surinam," the name often used instead of Dutch Guiana. The British crown bought the colony from the heirs of Lord Willoughby, but it passed into the hands of the Dutch about the time when Holland gave up the attempt to keep New Amsterdam, now New York. The statement often repeated, that Surinam was "exchanged" for New Amsterdam is incorrect.

1. **BRITISH GUIANA** is situated approximately between lat. 1° and 8° 40' N. It is bounded on the north and northeast by the Atlantic Ocean, on the east by Dutch Guiana, on the south by Brazil, and on the west by Brazil and Venezuela. Its area is 104,000 square miles. The old settlements of Essequibo, Berbice, and Demerara form counties with the same names. Of these, Demerara contains the capital of the colony (see **GEORGETOWN**); Essequibo, the town

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of Bartica, the point of departure for miners going to the gold-fields; and the capital of Berbice County is New Amsterdam. One of the chief points on the new boundary line with Venezuela, Mount Roraima, is an immense sandstone mass rising with perpendicular sides 2,000 feet above the slopes (themselves 6,000 feet above sea-level) which form its base. Some of the neighboring mountains resemble it in form, but are less imposing. Midway between this group and the Atlantic coast is the Imataca range, extending east-southeast to the confluence of the Cuyuni and Essequibo. The latter with its tributaries drains nearly the whole interior of the colony; the Demerara, though much smaller, is more important, because it flows through the region which has become the centre of population; the Corentyne is the boundary between British and Dutch Guiana.

Geology and Mineral Resources.—The original sea beach is found far inland, where it now appears as long stretches of white sand reefs, the sand being derived from a barrier of primary, volcanic and metamorphic rocks, which impedes the navigation of the rivers. The strip between this barrier and the ocean front—composed of layers of soft mud, clay, sand, broken shells, and decomposed vegetable matter—is really an enormous mud-flat, about 100 feet in depth, and covered with a rich, heavy loam, and in places, with a kind of peat called pegass. The whole interior of the country, between the agricultural coast-strip and the range culminating in Roraima, is an auriferous region. The gold is commonly found in combination with silver. Quartz-mines have been worked in upper Demerara, but placer-mines in the beds of former streams or the channels of existing ones are more usual. Other mineral products are iron, sapphires, diamonds, mercury, garnets, antimony, and plumbago. A sandstone formation characterizes the southwest, from Mount Roraima to the Potaro and Essequibo rivers, thence extending eastward across the Demerara, Berbice, and Corentyne. The sandstone is interbedded with volcanic rocks. In many parts of the colony there are red, yellow, and blue clays; and fine white clay, suitable for the manufacture of porcelain, is also found.

Soil and Climate.—The surface of the coast alluvium is so fertile that alternation of crops is not required; it is, however, very heavy and hard to cultivate. The thermometer ranges generally from 76° to 86° F., with little difference in this respect between day and night. Rainfall in some years 130 inches, in others not more than 70 inches. The year is divided into two rainy seasons (November–February and May–July), and two dry seasons. Neither destructive earthquakes nor hurricanes occur. There has been only one serious outbreak of yellow fever during 50 years. Death rate of the colony about 35 per 1,000.

Flora and Fauna.—Characteristic forest products are exceedingly hard and heavy woods. The greenheart, mora, and wallaba are valuable for building; the simaruba, letter-wood, and crabwood, for making furniture, etc. Vegetation in Guiana is remarkable on account of the altitude of the trees and the great size of leaves and flowers. The gigantic water-lily, *Victoria Regia*, is very common. Some of the orchids form large masses, with flower-stems 12 feet high. Common mammals are sloths, deer, ant-eaters,

tapirs, armadillos, peccaries, jaguars, cavies, and ring-tail monkeys. Monkeys belong to two families which are entirely confined to this region, and bats develop here their most extraordinary specializations. In some parts of the forest vampires are "ready to suck the foot or even the cheek of the unwary traveler." The manatee (*vulgo* "mermaid" or "water-mamma"), inhabiting some of the large rivers, and coming to the surface at intervals to breathe or to graze on the plants which line the banks, owes its popular designations to the circumstance that it suckles its young at the breast. The representative families of birds are, with few exceptions, peculiar to this region, the list of such birds including greenlets, tanagers, hang-nests, sugar-birds, tree-creepers, manakins, and cotingas. Alligators and boa constrictors both attain to great size in this region; iguanas and smaller kinds of lizards are numerous. Among the insects, the variety of genera and species can, it is thought, scarcely be equaled in any other part of the world. Uncommon brilliance of coloring is characteristic of both the birds and the insects.

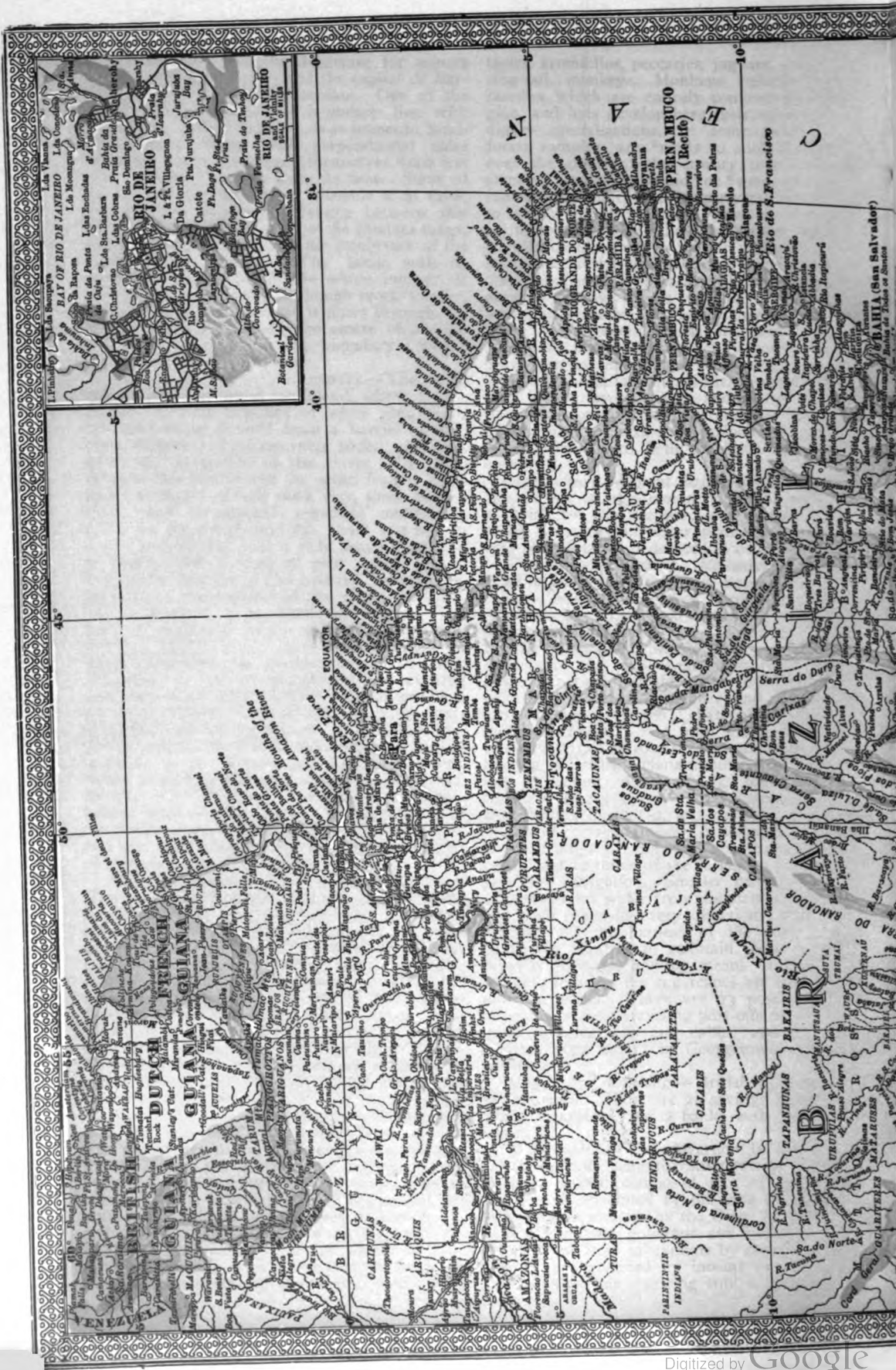
Agriculture.—About 80,000 acres are under cultivation, or, say, one acre out of every 100 available for the purpose; and of this amount 71,766 acres are in sugar plantations. Only a very small portion is devoted to coffee and cocoa.

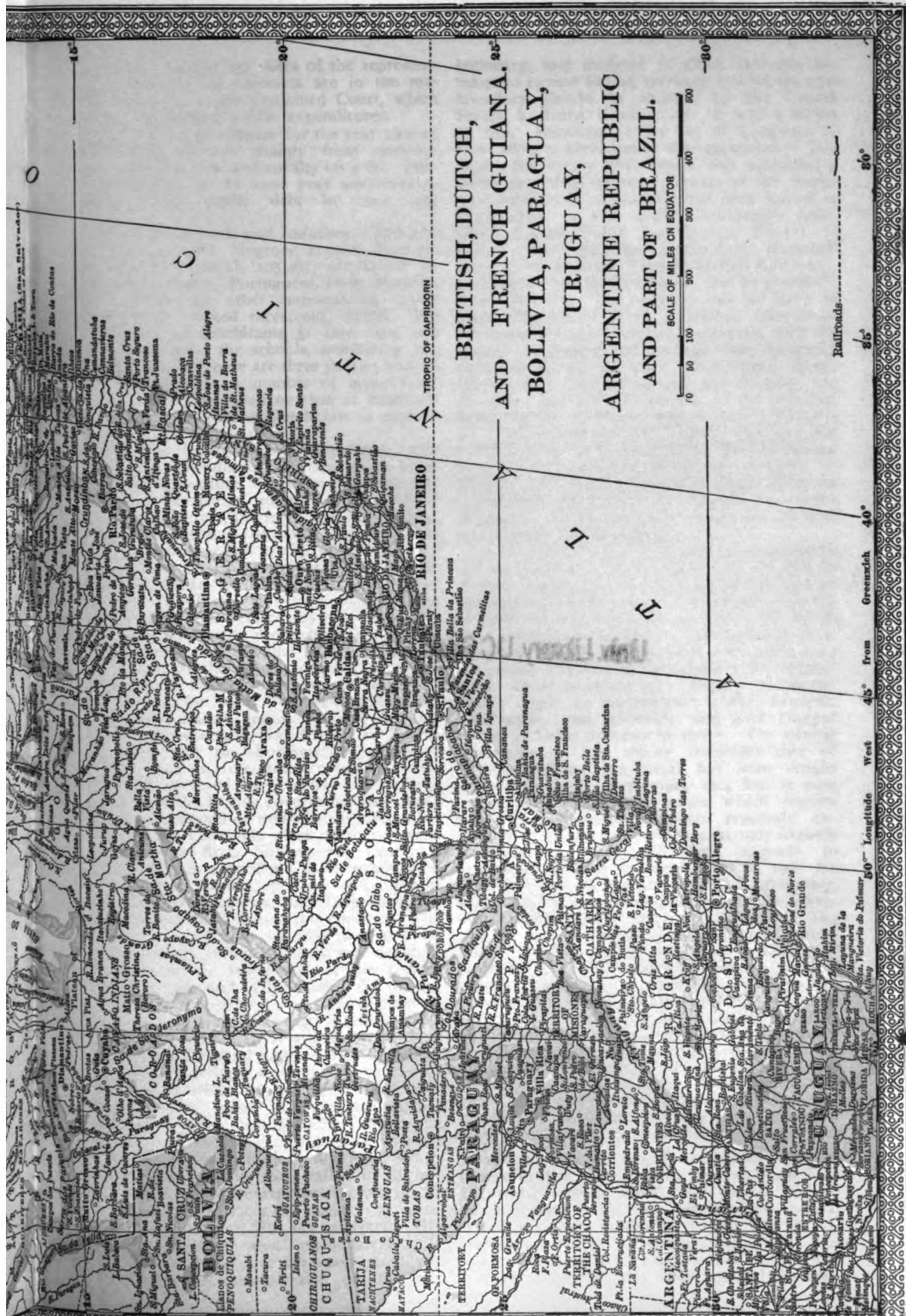
Commerce, Shipping, Railways, etc.—The chief imports (1909-10) were tissues, flour, machinery, manures, rice, fish, hardware, coal, and tobacco, cigars, and cigarettes. The total value of imports (principally from Great Britain and British possessions) was £1,774,457. The chief exports in the same year, with their values: Sugar, £1,205,215; gold, £229,516; rum, £128,598; balatta, £95,507; timber and woods £24,928; diamonds, £9,386; charcoal, £6,000; and molasses, £5,000. The total value of exports was £1,985,337. In 1901 the registered vessels belonging to British Guiana numbered 48, comprising 32 sailing vessels (1,497 tons), and 16 steamers (2,213 tons). Total tonnage entered and cleared, in 1901-2, was 725,867. (See also routes of vessels under GEORGETOWN.) There are 108 miles of railways, 264 miles of good roads, and 12 miles of the larger sort of canals, used for navigation. Smaller canals, to carry off superfluous water from the plantations, intersect each other in every direction. The heavy rainfall and the flatness of the coast region oblige the planters to maintain these canals to provide drainage, and by means of the larger draining trenches the sugarcanes are taken to the mills in punts. There are 73 post-offices, 46 telegraph offices, 9 traveling post-offices, about 559 miles of telegraphs and cables, and telephone services (677 miles) in Georgetown and New Amsterdam.

Money and Banking.—British gold and silver are used. There are 25 savings banks, with 21,266 depositors, and 2 banks with note circulation.

Government.—The governor is assisted in executive and administrative matters by an advisory council, composed of 3 colonists and 3 officials, all appointed by the king of England; in legislative matters by the Court of Policy (7 officials beside the governor, and 8 elective members, chosen from inhabitants by constituency of 2,676 voters qualified by income or property). The governor has a casting vote, and can decide

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BRITISH, DUTCH,
AND FRENCH GUIANA.
BOLIVIA, PARAGUAY,
URUGUAY,
ARGENTINE REPUBLIC
AND PART OF BRAZIL.

SCALE OF MILES ON EQUATOR
0 50 100 200 300 400 500

Railroads
45° 50°

Longitude West 45° 50° From Greenwich

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any question against the votes of the representative members. The colonists are in the majority, however, in the Combined Court, which votes the taxes and public expenditures.

Finances.—Total revenue for the year 1909-10 was £540,269, derived mainly from customs, licenses, duty on rum, and royalty on gold. Public expenditures in the same year amounted to £546,711. The public debt in 1910 was £888,115.

Population, Schools and Judiciary.—The census of 1891 showed: Negroes, 115,538; East Indians (Hindu coolies), 105,465; aboriginal Indians, about 17,463; Portuguese from Madeira, 12,166; whites of other nationalities, 4,558; Chinese, 3,433; mixed races, etc., 29,376. The total number of inhabitants 31 Dec. 1909 was 305,090. In 1901-2 the schools, numbering 213, had 26,684 pupils. There are three judges, and, in the several districts, a number of magistrates. The criminal law is based on that of England; in civil cases the Roman-Dutch law is applied, with certain modifications.

History (including the boundary dispute with Venezuela).—Prohibition of the slave trade checked the agricultural development of the colony, and emancipation of the slaves (1838) ruined many planters, the freed negroes demanding higher wages than the planters could afford to pay. This crisis led to the introduction of large numbers of laborers from Madeira, the East Indies, China, and Malta. Immigrants of a different class began to arrive about 1886 in consequence of the rediscovery of gold; but serious difficulties arose precisely on account of the enhancement in the value of the auriferous regions, some of the most promising of which were located in the territory west of the Essequibo claimed by both Venezuela and Great Britain. The inland limits of the Spanish (afterward Venezuelan), the British, the Dutch, the French, and the Portuguese (afterward Brazilian) Guianas were undetermined. In 1841 Schomburgk surveyed the boundary line of British Guiana for the British government, and made two maps; the second or revised map placing the boundary with Venezuela much farther toward the west than the first. Subsequently Venezuela and Great Britain agreed not to encroach upon the territory in dispute, pending a settlement of the boundary question, but both countries offended against the spirit of this compact. The proposal for arbitration in 1887 was met by England's prompt refusal to admit any doubt as to her title to the lands east of the revised Schomburgk line, and, a little later, by the establishment of British posts, and the declaration that the region drained by the Barima River was hers by right. It is necessary to bear in mind that if England had accepted the views of Venezuela and Brazil as to the boundaries of British Guiana, that colony would have disappeared from the map. Brazil claimed all but about 12,000 square miles; Venezuela nearly the whole of the old Essequibo colony, the Pomeroon and the unsettled interior districts. When President Cleveland, in 1895, called to the attention of the British government the bearing of the Monroe doctrine upon the question at issue, his suggestion was at first not accepted. His message to Congress went much farther. It advised Congress that a commission should be appointed for the determination of the true

boundary, and declared in effect that any attempt to extend British territory beyond the true boundary should be resisted by the United States, by force, if necessary. It was a threat of war. Pursuant to the act of Congress 21 Dec. 1895, a commission was appointed 1 Jan. 1896. But before their report was submitted a treaty providing for the reference of the matter to a tribunal of arbitration had been signed at Washington (2 Feb. 1897). Arbitrators were: Chief Justice Fuller and Justice Brewer of United States Supreme Court; Lord Herschell (and, after his death, Lord Russell of Killowen), and Justice Sir R. H. Collins; and as president, Prof. Martens. The tribunal met at Paris in 1899. The award, given 3 October, determined the boundary nearly in correspondence with the second or revised Schomburgk line, assigning to Great Britain a region about 60,000 square miles in area which Venezuela had claimed. On the other hand, Point Barima, at the principal mouth of the Orinoco, and certain gold-fields near the headwaters of the Cuyuni, were awarded to Venezuela. The territory of British Guiana, thus defined, extends along the seacoast to Point Playa, and includes the whole valley of the Barima and that of the Cuyuni east of the Wenamu—the larger part, though not the best part, of the mining region.

2. **DUTCH GUIANA OR SURINAM** is bounded on the north by the Atlantic Ocean, on the east by French Guiana, on the south by Brazil, and on the west by British Guiana. It extends from lat. 2° to 6° N., and from lon. 53° 50' to 58° 20' E. Area 46,072 square miles. The political divisions are districts, 16 in number, and communes; the capital, Paramaribo, has about 31,817 inhabitants. Chief products are: Cacao (75 plantations), sugar (7 plantations), coffee, bananas, rice, maize, rum, molasses, and gold (output valued at about \$571,000 in 1907). The mining experience of this colony resembles that of British Guiana; the metal has been sought hitherto in beds of streams, etc., but is now being taken also from mines which require crushing machinery. Imports regularly exceed in value the exports; thus in 1907 imports amounted to \$1,531,068, and exports to \$1,300,837. During the years 1897 to 1901 the value of exports remained almost stationary, while that of imports steadily increased. Executive authority is vested in a governor. The representative assembly, called the Colonial States, is composed of members chosen for 6 years by a limited number of electors. The council consists of 5 members, including the governor himself as president, and represents the sovereign. The revenues of the colony fall short of the expenditures. The military force is about as follows: Garrison, 20 officers and 351 men; militia, 27 officers and 411 men; and civic guard, 59 officers and 1,061 men. There are a few guard ships and vessels of the royal navy. The number of inhabitants in 1908 was somewhat more than 81,000. Educational institutions are:

A normal school; schools maintained by the Moravian Brethren and the Roman Catholics; 33 private schools, with 4,822 pupils; and 20 public schools, with 2,342 pupils. The judicial system comprises a court of justice (all the officers appointed by the queen), two circuit, and three district courts. Slavery was abolished 1 July 1863, but the authorities imposed the con-

ditions that for 10 years the emancipated negroes should remain upon the plantations of the districts in which they had formerly lived, and should perform the same kind of work for wages that they had been accustomed to while in bondage. After 1 July 1873, the importation of laborers to replace the freedmen became a matter of life and death in Surinam as in the neighboring colonies, for agriculture was almost ruined.

3. FRENCH GUIANA, lying between the Atlantic Ocean, Brazil, and Dutch Guiana, has an area of about 30,500 square miles. Besides Cayenne, capital of the colony, and its only port (population, according to the latest census, 12,612), there are 13 communes. Mineral productions are gold, silver, marble, phosphates, and iron. In 1901 the exports of gold amounted to 94,147 ounces. Agricultural productions are varied (including sugarcane, cocoa, coffee, rice, indigo, tobacco, maize, and manioc), but laborers are few, the area under cultivation is small, and the total value of the crops insignificant. Here, as in Dutch Guiana, the value of exports is much less than that of the imports, the difference in 1901 being about \$689,750. Colonial interests are entrusted to a governor and privy council of 7 members, and one deputy represents the colony in the French Parliament. There is also an assembly called the Council-General, composed of 16 members. Revenue and expenditures for 1908 were each estimated at £264,408; but the cost of maintaining the penal establishment (\$1,139,122, according to the budget of 1903), is borne by the French republic. Between 300 and 400 French soldiers are kept in the colony. The total population, including convicts and Indians, was given as 32,908 in 1901. Cayenne has a superior court, court of first instance, and two justices of the peace; a college, a library, and a museum; in the entire colony there are 27 primary schools.

From the first, the French undertaking in Guiana has been unsuccessful. On 11 Dec. 1653, the survivors of the original colony abandoned the fort and sailed away, after suffering from hunger and disease. A new company formed for the colonization of Cayenne in 1663 was scarcely able to hold its own against hostile neighbors in Brazil. The deportation of political prisoners to Guiana at the end of the 18th century completed the ruin which Portuguese attacks had begun; for the exiles ascribed the death of their companions to the climate; and French Guiana was completely discredited in the eyes of the world. In January 1809, the colony surrendered to the Portuguese and English. It was restored to France by the treaties of 1814-15. Since 1855 it has been used as a penal settlement. In 1902 the number of convicts in residence there was 10,075, including 240 women. The boundaries with Brazil were determined 1 Dec. 1900, by the Swiss court of arbitration.

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MARRION WILCOX,
Authority on Spanish America.

Guicciardini, Francesco, frân-chês'kô gwêchâr-dê'nê, Italian historian: b. Florence 6 March 1483; d. there 23 May 1540. He studied at Padua, and became an advocate and professor of law at Florence. In 1512 he was appointed ambassador to the court of Ferdinand the Catholic of Spain. At a later period he was invited by Leo X. to his court, and entrusted with the government of Modena and Reggio. This office he discharged also under Adrian VI., to the general satisfaction; and afterward, when Clement VII. (de' Medici) ascended the papal chair, Guicciardini was sent as lieutenant of the pope to Romagna. He contributed here to the public good by restoring civil order, constructing roads, erecting public buildings, and founding useful institutions. Having been appointed lieutenant-general of the pope, he, in 1521, defended Parma when besieged by the French. In 1534 he began his great work 'Istoria d'Italia' (1561-4) extending from 1490 to 1534. In 1537 he contributed greatly to the elevation of Cosmo de Medici to the office of grand-duke, but when later he attempted to impose constitutional limitations upon the grand-ducal power, he lost his influence. The 'History' was translated into English by Goddard, and the translation published between 1753 and 1761. The reader of Guicciardini is sometimes offended by a want of method, and his statements cannot always be depended on as derived from the best sources.

Guide-birds, or Honey-guides, certain small, mainly black and yellow birds, allied to the barbets, and constituting a genus inhabiting the tropical regions of the Old World, which have the curious habit of attracting the attention of men, and of honey-loving quadrupeds, to bees' nests, profiting by the disturbance which follows. They are fond of bees, grubs, and honey, but cannot often get them without assistance; sometimes, also, they show equal zeal in leading a person to a snake, leopard, or something else which has attracted their notice. Although the genus is known in India and Malaya, it is in South Africa that its traits are most noticeable and the books of travelers and explorers there abound in accounts of its guiding habits. Sir John Kirk contributed the following exact description of the work of *Indicator minor* to the 'Ibis' (1864):

"The honey-guide is found in forests, and often far from water, even during the dry season. On observing a man it comes fluttering from branch to branch in the neighboring trees, calling attention. If this be responded to, as the natives do by whistling and starting to their feet, the bird will go in a certain direction and remain at a little distance, hopping from one tree to another. On being followed it goes further; and so it will guide the way to a nest of bees. When this is reached, it flies about, but no longer guides; and then some knowledge is needed to discover the nest, even when pointed out to within a few trees. I have known this bird, if the man after taking up the direction for a little then turns away, to come back and offer to point out another nest in a different part. But if it do not know of two nests, it will remain behind. The difficulty is, that it will point to tame bees in a bark-hive as readily as to those



1. Guide-bird (*Indicator sparrmanni*).
2. Garden Warblers (*Sylvia curruca* and *S. rufa*).

3. Guinea Hens (*Numida cristata* and *N. meleagris*).
4. European Golden Oriole (*Oriolus galbula*).
5. Grackle (*Eulabes religiosa*)

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GUIDO RENI — GUILD

in the forest. This is natural, as the bee is the same; the bark-hive, 'musinga' as it is named, being simply fastened up in a tree and left for the bees to come to. The object the bird has in view is clearly the young bees. It will guide to nests having no honey, and seems equally delighted if the comb containing the grub be torn out when it is seen pecking at it."

Guido Reni. See **RENI, GUIDO**.

Guidon, gî'don, a swallow-tailed flag, such as is carried by a regiment of cavalry or mounted artillery. In the United States cavalry the regimental guidon is half red and half white, dividing at the fork. The red above has "U. S." in white. The white is below and has the letter of the company in red. The fly is 3 feet 5 inches to the end of the tail; the head is 27 inches. The lance is 9 feet long, including spear and ferrule.

Guienne, gē-ên', or **Guyenne**, ancient Aquitania (q.v.), a former southwestern province of France, now divided into the departments of Gironde, Lot, Lot-et-Garonne, Dordogne, Aveyron, and part of Landes and of Tarn-et-Garonne. The capital was Bordeaux.

Guija, gwē'hā, a lake in the republics of Guatemala and San Salvador, in Central America. It is in a volcanic region, and contains two small volcanic islands.

Guikowar, gik'wār, the native title of the Mahratta prince, ruler of the province of Baroda (q.v.) in British India. The ruling Guikowar in 1874 was tried for attempting to poison the British resident and was deposed. Since 1802, when the province lost its independence to the English, the authority of the Guikowar has been merely nominal.

Guild, Curtis, American journalist: b. Boston, Mass., 1827. After several years devoted to reporting for the *Boston Journal*, he became one of the owners of the *Boston Traveller* and in 1859 established the *Boston Daily Commercial Bulletin*, of which he became the editor. He has published 'Over the Ocean' (1867); 'Aboard Again' (1873); 'Britons and Muscovites' (1888); 'A Chat About Celebrities'; 'From Sunrise to Sunset' (verse).

Guild, Curtis Jr., American journalist and politician: b. Boston, Mass., 2 Feb. 1860. He was graduated at Harvard in 1881 as class orator, and entered the employ of the *Commercial Bulletin* of Boston, conducted by his father, Curtis Guild (q.v.). He interested himself at once in local politics, was Republican delegate-at-large to the St. Louis convention in 1896; and active in securing the gold plank in the national platform. In the following campaign he made a political tour of 10 States. He was appointed brigadier-general of Massachusetts militia and inspector-general of rifle practice by Gov. Roger Wolcott. At the outbreak of the Spanish war he was appointed lieutenant-colonel and inspector-general, United States Army, serving in the Seventh Army corps under Gen. Fitzhugh Lee. In 1900 he accompanied Gov. (now President) Roosevelt on a tour of political speaking through the West. In 1902 he became sole owner of the *Commercial Bulletin*.

He was elected, 4 Nov. 1902, lieutenant-governor of Massachusetts, with John L. Bates, governor-elect; and was inaugurated 10 Jan. 1903. In 1905, 1906 and 1907 he was elected governor.

Guild, Reuben Aldridge, American librarian and author: b. West Dedham, Mass., 4 May 1822; d. 1899. His published works include: 'Biographical Introduction to the Writings of Roger Williams' (1866); 'History of Brown University with Illustrative Documents' (1867); 'Chaplain Smith and the Baptists' (1885).

Guild, a fraternity, society or company, formerly active in commerce and mechanics. Guilds played an important part in public affairs in the Middle Ages. The Romans had various mechanical fraternities, but these seem to have been merely religious and political societies; while the associations of workmen in the arsenals that existed under the empire were regular hereditary castes, enjoying certain privileges and bound to certain duties. In Italy, the cradle of the class of free citizens in the Middle Ages, and particularly in the Lombard cities, those connecting links between the ancient and modern civilization, some remains of these Roman institutions, or recollections of them, probably contributed to revive the guilds, which naturally presented themselves as an excellent means of supporting the citizens against the nobility by uniting them into powerful bodies. It is certain that small societies existed as early as the 12th century, which appear, in the following century, to have been in the possession of important political privileges. When the advantages of these associations became known and felt they rapidly increased; and in the struggles of the citizens and the nobility the principal resistance against the latter was made by the corporations. As soon as the citizens acquired an influence on the administration the guilds became the basis of the municipal constitutions, and every one who wished to participate in the municipal government was obliged to become the member of a guild. Guilds in Germany possessed no political importance before the 13th century. At this time they acquired the right of bearing arms for the defense of their own interests, and when a struggle arose between them and the citizens belonging to ancient families the guilds were victorious, and became so powerful that even persons of "free occupations" joined these associations as the allodial possessors of land sometimes placed themselves under feudal lords. The by-laws of the German guilds contained regulations as to the training of apprentices, the practice of one's trade in different towns as a journeyman, and the requirements of a master. At an early period these workmen's associations met with opposition, but the opposition was not at first directed against them on account of the obstacles they threw in the way of commercial intercourse, and the other evil consequences of their monopoly, but simply on account of their political influence. In the 18th century several edicts were made in Germany against the abuses of the guilds, and at different dates in the 19th century freedom was granted in most of the states of Germany to all to practise any trade without being admitted into a guild. In Austria this was done in 1860, and

GUILDHALL — GUILFORD COURT HOUSE

in 1868 it was done for all the states of the North German Confederation.

In Great Britain the societies of mechanics were important principally in a political respect, on account of their connection with the democratic element of the constitution. These societies originated at the time of the development of the importance of the cities. In the towns where they long existed they had an important influence in the election of representatives, and in the municipal administration. These guilds, in England, had no legal right to prevent any man from exercising what trade he pleased. The only restriction on the exercise of trades was the statute of Elizabeth, requiring seven years' apprenticeship. The guilds of the city of London (among the oldest of which are the weavers, founded in 1164; the parish clerks, in 1232; the saddlers, in 1280; the fishmongers, in 1284; the goldsmiths, in 1327; the skimmers, in 1327; and the grocers, in 1345) are still very important corporations, still continuing to fulfil the chief object for which they were founded—that of giving relief to poor and decayed members, and also having in many cases the management of vast funds bequeathed for benevolent purposes by persons who selected one or other of the guilds as trustees. Sometimes these funds are bequeathed for specific purposes, which the guilds, as trustees, are of course bound to carry out; but in other cases, where they are available for general purposes, the guilds have usually shown great discretion in the manner in which they have employed them. Besides the secular guilds or mechanics' associations there were from a very early period, in Great Britain, religious guilds, resembling the religious societies of modern times. From the time of Henry II. all such guilds were required to have a charter from the crown. In 1388 a return to these guilds was ordered to be made, and it was then found that that of Corpus Christi, York, numbered 14,800 members. Some of the most objectionable features of the ancient guilds have again been developed by some of the trades unions, their modern representatives.

In France guild-privileges were sold by the state from the 10th century till the revolution of 1789, and the position of the artisan had come to be a most pitiable one; but at that date every restriction on the exercise of any trade was removed. This was done also at a later period in Belgium, Holland, Italy, Sweden (1846), and Denmark (1862). An account of guilds in America will be found under **LABOR UNIONS**. See also **TRADE UNIONS** for the modern European history of guilds.

Guildhall, the usual designation in England for the mediæval city halls, the most famous of which is the London Guildhall, King Street Cheapside, first built in 1411, all but destroyed in the fire of 1666, and rebuilt in 1669. The façade dates from 1789. The great hall used for the famous city feasts, the election of city officers and members of Parliament, and for the public meetings of the livery and freemen, is 153 feet long, 48 feet broad, and 55 feet high. It is decorated by statues of various celebrities, and in the common council room there is a collection of valuable paintings.

Guilford, Conn., a town and borough of New Haven County, on Long Island Sound, and on the New York, N. H. & H. R.R., 14

miles east of New Haven. It was settled as Menunkatuck by English colonists in 1639, and one of the ancient stone buildings of that date is now used as a State museum. Farming, canning, iron working, and some woolen manufactures are the chief industries. Halleck the poet was a native and resident of Guilford. Pop. of town and borough (1910) 3,001; of town, 1,393.

Guilford (gīl'fōrd) College, N. C., a town of Guilford County, on a branch of the Southern R.R., six miles west of Greensboro. It was incorporated in 1895 and derives its name from Guilford College, a coeducational establishment controlled by the Friends, and founded in 1837. The income of the college is \$38,500, and it has a library of over 6,000 volumes.

Guilford Court House, **Battle of**, 15 March 1781; in results one of the decisive battles of the Revolution. Cornwallis at Hillsboro proclaimed that he had conquered North Carolina, and called on the well-disposed to rally around him; Greene, awaiting reinforcements near the Virginia border, perceived the necessity of showing the patriots they were not abandoned, and advanced across the Dan. After some days of fencing and recruiting, Greene halted for battle at Guilford Court House. He had about 4,400 men, but 3,000 were militia; and of his Continental regulars, only the Virginians and the First Maryland were veterans, the Second being new. Cornwallis had 2,213 trained troops. Greene posted his first militia line in an open field, to thin the British front before giving way; the second in a wood 300 yards back; the regulars on a rise 400 yards to the rear, near the court-house. Their front was convex: the Virginians on the right, then in succession Singleton's artillery, Gunby and Howard's First Maryland, and Ford's Second Maryland on the left. Lee's Legion and Campbell's riflemen guarded the left flank; William Washington's cavalry, Lynch's rifles, and the remnant of the Delaware regiment, the right flank. The British routed the first militia after it fired one or two volleys; but only drove the second from the wood after an obstinate and murderous combat. Advancing against the hill, their left was riddled by a withering fire, and then broken by a bayonet charge of the First Maryland; but their right crushed the Second and captured two cannon. The First faced about and checked it; Washington in turn pierced the British line and retook the pieces. The First steadily crowded back their opponents with the bayonet; and Cornwallis only stayed the tide of defeat by ordering his artillery to open on the Marylanders through his own ranks, checking the pursuit at heavy loss to himself. Reforming, the British moved forward; and with double the number of real troops, carried the hill and held it against every assault. Toward evening Greene, after five hours' conflict, withdrew, leaving his artillery on the field because the horses were killed. The American loss was 79 killed and 184 wounded; and about 1,000 militia dispersed to their homes. Cornwallis lost 93 killed, 413 wounded, and 26 missing—532 in all, or a quarter of his entire force. He announced a victory to Parliament, but Fox declared that "another such victory would destroy the British army"; and, in fact, Cornwallis had to fall back on Wilmington, abandoning his hold on the

GUILLAUME — GUINEA-FOWLS

Carolinas, except two or three places on the coast, and shortly going to Virginia and capture.

Guillaume, gwī-yōm', Eugene, French sculptor: b. Montbard, France, 4 July 1822; d. Rome, Italy, 28 Feb. 1905. He opened his first studio at Dijon, and subsequently became a pupil of Pradier at Paris. In 1845 he carried off the Grand Prix de Rome. It was during studies at Rome that he manifested that mastery of the human form which appears in his 'Reaper,' which he modeled at Rome. It was subsequently cast in bronze, and is now in the Luxembourg. In 1852 he produced in marble the sitting figure of Anacreon with the dove of Venus. He was, however, less successful in ideal creations than in portrait busts. His statues of Napoleon I. as lieutenant of artillery and as emperor, his bust portraits of Archbishop Darboy, of F. Baloz, Ferry, and Thiers are characteristic and dignified, but he is perhaps best known for his sculptures on the façade of the New Opera House, Paris (1869); 'The Fount of Poetry' (1873); 'Aopheus' (1878); 'Two Herms'; 'Anacreon with Eros'; and 'Sappho with Eros and Andromache.' He was the designer of the medals given at the expositions of 1867 and 1878.

Guillemet, Jean Baptiste Antoine, zhōn bāp-tēst ān-twān gwī-yī-mā, French painter: b. Chantilly 1842. After studying under Corot and Oudinot he exhibited for the first time in 1865. He chooses for his subjects the scenery of Normandy, and the Seine valley, and is faithful in his transcripts from nature, but his work lacks the color and subtlety as well as the imagination of the Barbizon school. His 'View of Bercy' and 'View of Paris' are in the Luxembourg.

Guillotine, gīl'ō-tēn, a machine for beheading, so called from Dr. Joseph Ignace Guillotin, and introduced during the French revolution. It consists of two posts united at the top by a cross beam, and furnished with grooves, in which a broad steel blade heavily weighted with lead descends by the impetus of its own weight on the neck of the criminal, fastened to a plank beneath. The certainty and speed with which this instrument separates the head from the body gives it an advantage over the axe or sword wielded by the hand. Machines of a similar description have been in use among many nations. In Italy, from the 13th century, it was the privilege of the nobility to suffer capital punishment by an instrument called the *mannai*, closely resembling the guillotine. In Germany, likewise, during the Middle Ages, an instrument resembling the guillotine was made use of, though the blade did not fall upon but was thrust through the neck of the criminal. There was formerly employed in Great Britain, also, and more especially in Scotland, an instrument of decapitation called the "maiden," said to have been introduced by Regent Morton, who himself afterward suffered by it. It differed from the guillotine in this, that while the blade of the guillotine falls upon the neck of the criminal, in the maiden the blade is fixed with its edge upward, and the neck of the criminal is forced down upon it by the fall of a heavy weight. Such an apparatus

was also known and used at an early period in France. The Dutch likewise formerly made use of a decapitating machine.

Dr. Guillotin was not the inventor of the instrument which bears his name, and had only a secondary share in its introduction into France. As a member of the constitutional assembly he proposed to that body to abolish all class distinctions in the method of inflicting capital punishments, and with that view to have some instrument invented which might do the work more quickly and certainly than the hand of the headsman. The establishment of a new penal code having now become the subject of deliberation, a vote for a uniform system of capital punishment was, on the motion of Dr. Guillotin, passed on 21 Dec. 1789, with a recommendation that the least painful method of inflicting it should be adopted. It was not till 1792, however, that this special machine was selected after a report from Dr. Ant. Louis, secretary to the College of Surgeons. The guillotine was first erected in the Place de Grève at Paris, and the first execution performed by it on 25 April 1792, on a highwayman. Shortly afterward, in remembrance of Guillotin's original proposition, it received the name of "guillotine," both popularly and in official language, and it was introduced wherever the penal code of France has been adopted.

Guimaras, gē-mā-rās', Philippines, an island lying west of Negros and south of Panay, forming with Panay the strait of Iloilo. The east coast is mountainous, the west coast, open and fertile; an excellent road follows the entire coast, except for a distance of 10 miles, and the most important towns are on this road. The products include rice, corn, cotton, and tobacco, and there are important fishing interests. The island is a part of the province of Panay.

Guimbal, gēm-bāl', Philippines, a pueblo of the province of Iloilo, island of Panay, situated on the southeast coast, at the mouth of a river, 17 miles west of the town of Iloilo. Pop. 10,950.

Guinaan, gē nā'an, a Malay tribe of the Philippines, inhabiting the watershed of the Rio Abra and the Rio Grande de Cagayan, island of Luzon, and the neighboring region of Isabela and Abra. They are a heathen, head-hunting tribe, and have a distinct language.

Guinea, gīn'ē, an English gold coin, first issued in 1663; by a proclamation issued 22 Dec. 1717, the guinea was declared current at 21s. sterling. Its true value, as derived from the market values of gold and silver at that time was 20s. 8d., about \$4.96. It has not been coined since 1817, when the sovereign supplanted it, but the fashion still prevails of quoting prices of some things in guineas, and subscriptions are frequently recorded in the same denomination.

Guinea-corn, a name given to durra, *Sorghum vulgare*, cultivated in the United States under the name of broom-corn. See DURRA; BROOM-CORN.

Guinea-fowls, a family of gallinaceous birds (*Numididae*) allied to the pheasants and turkeys, natives of Africa and Madagascar. Twenty-three species are known, the most familiar being the common guinea-fowl of our poultry yard (*Numida meleagris*). This bird ranges in a wild state from Senegambia to the Niger

GUINEA-GRASS — GUISE

River, and is found also on the Cape Verde Islands. It is supposed to have been first brought to Europe by Portuguese explorers in the 16th century; but these fowls were domesticated in Rome during the classic period. Of the other species the vulturine guinea-fowl (*Acryllium vulturinum*) is one of the handsomest, being striped with brilliant blue; while the black guinea (*Phasidus niger*) and the turkey-like guinea (*Agelastes meleagrides*) are peculiar in possessing spurs.

Guinea-grass, a kind of grass (*Panicum maximum*), often 6 or 10 feet in height, a native of western Africa, which has been naturalized in South America and the West Indies, and is largely cultivated for fodder.

Guinea, Gulf of, that portion of the Atlantic on the coast of Africa, between Capes Lopez and Palmas. Two of its arms are the bights of Benin and Biafra. The Niger flows into this gulf south of the bight of Benin. A number of small streams enter from French Kongo and Kamerun. It contains a number of islands, chief of which are St. Thomas, Fernando Po, and Prince's Island. The gulf has two currents, one setting eastward into the bights of Biafra and Benin, and the other coming from the south; they meet in the bight of Biafra, and unite in one stream which gradually expands as it flows northwest, then west and southwest.

Guinea-pig, or **Cavy**, a small, variable domesticated race of the restless cavy (see CAVY), bred in all parts of the world as a children's pet. It is about six inches long, and exists in several races, some short-haired, others with long, curiously ruffled hair. The colors are greatly varied, white, black and a mixture in quaint pattern of white and tan being preferred. It is a restless, grunting little creature, showing a small amount of intelligence, but gentle and amusing. It feeds on vegetables, bread, parsley, lettuce, etc., and is exceedingly cleanly in its habits. It begins to breed when five or six months old, the period of gestation being from 9 to 10 weeks, and the litters averaging from 4 to 5; and this extreme fecundity seems to be its only means of defence against extinction. The name is probably a corruption of "Guiana-pig," referring to its native home and its pig-like form and grunting. English children call them "cavies." They are bred by fanciers for show purposes, and clubs exist for the improvement of standard breeds.

Guinea-worm, a nematode worm (*Filaria medinensis*), the female of which may be three feet long, and as thick as a knitting-needle. It is a parasite in the feet and toes of residents of the East Indies and African coast, forming abscesses beneath the skin in which the worm is coiled up. It produces the disease known to the Greeks as dracontiasis, and one of those now called filariasis (q.v.). To extract the worm it must be slowly wound upon a roll of paper, a little at a time, care being taken not to break the worm, as if a portion is left in the abscess, the young will develop and be scattered under the skin. Although formerly confined to the Old World, the guinea-worm has recently been found in the tropics of America, but is very rarely seen in northern parts.

Guinevere, gwin'č-vēr, the wife of King Arthur in the Arthurian legends (q.v.). In the

first accounts of the Arthurian court, she plays a very unimportant part, and her character is not clearly portrayed. It is in the 13th century that the personality of the queen and the story of her love for Lancelot are first developed. The most vivid and powerful picture of Guinevere is that given by Tennyson in the 'Idylls of the King,' in which her sinful love for Lancelot is made the real cause of the downfall of the Round Table and Arthur's kingdom.

Guiney, Louise Imogen, American poet: b. Boston 7 Jan. 1861. She began to write for publication in 1880 and was a frequent contributor to 'The Pilot,' Boston. Her published works include 'Songs at the Start' (1884); 'The White Sail and Other Poems' (1887); 'A Roadside Harp' (1893); 'Martyr's Idyl and Shorter Poems' (1899); and in prose she has also published: 'Goose-Quill Papers' (1885); 'Brownies and Bogies'; 'Monsieur Henri' (1892); 'A Little English Gallery'; 'Lovers' Saint Ruths'; 'Patrins' (1897); 'The Secret of Fougereuse'; etc. She has edited an edition of Mangan's poems.

Guinness, Sir Benjamin Lee, Irish philanthropist: b. 1 Nov. 1798; d. 19 May 1868. He was a member of the great Dublin brewing firm, the largest in the world. In 1865-8 he was M. P. for Dublin. He restored St. Patrick's Cathedral, Dublin, at a cost of \$700,000. His business in 1886 was placed in the control of a limited liability company, employing 3,000 persons and having a capital of £6,000,000.

Guinness, Sir Edward Cecil, Irish philanthropist: b. 10 Nov. 1847. He was the son of Sir B. L. Guinness (q.v.). In 1891 he became Baron Iveagh. He gave \$1,250,000 for the purpose of erecting sanitary dwellings for working people at a low rent. Of this sum \$1,000,000 was to be given to London, and the remainder to Dublin. The income obtained on the capital is to be employed in the same fashion.

Guinobatan, gē-nō-bā'tān, Philippines, a town in the province of Ambos Camarines, island of Luzon, on the Quinali River. Pop. 10,000.

Guise (gü-ēz or gēz) Family, The, French ducal house, a branch of the family of Lorraine. The founder was Claude, a younger son of René II., duke of Lorraine, who in 1506 became naturalized in France, and in 1513 married Antoinette de Bourbon, the daughter of the Count of Vendôme. In his favor the county of Guise (one of his numerous possessions in France) was erected in 1528 by Francis I. into a duchy. He died in 1550, leaving behind him five daughters (the oldest of whom, Marie, married James V. of Scotland, and was the mother of Mary, queen of Scots) and six sons—François, who succeeded him in the duchy of Guise and his other dignities; Charles (usually known as Cardinal of Lorraine), Louis (Cardinal of Guise), Claude, François, and René, all persons of note. The family acquired great political importance on the accession of Francis II., who was married to Mary, queen of Scots. François, the second duke of Guise, was assassinated in 1563, and left three sons, Henri who inherited his father's titles; Louis, cardinal of Lorraine and archbishop of Rheims (both put to death in 1588 on the command of Henry III.); and Charles, duke of Mayenne. Henri, third duke

GUISE — GULFPORT

of Guise, was succeeded by his son Charles, who died in Italy in 1640, and was succeeded by his second son Henri. Henri died without issue in 1664, when he left the title to his nephew, Louis Joseph, duke of Joyeuse and Angoulême. His son and successor, François Joseph, died in 1671, leaving only one son, who died at the age of five in 1675, when the direct line of the house of Guise became extinct. In 1704 the title was revived for the house of Condé.

Guise, France, a town in the department of Aisne, on the Oise, 25 miles by rail north-east of St. Quentin. It is an ancient city, mentioned as early as 1050, and has interesting remains of the 16th century castle of the famous Dukes of Guise. The town is noted for the ironworks of Dequerème et Cie founded by Jean Baptiste André Godin, and conducted on a profit-sharing plan. The workmen are provided with dwellings on the associated plan; the first portion of the *familistère* was erected by Godin in 1859-60 at a cost of \$400,000. In connection with the workman's colony is a *phalanstère*, or common dwelling-house accommodating 400 families, a theatre, library and reading-room, schools, nursery, covered playgrounds, and a co-operative store.

Guitar, a stringed musical instrument, with an oval body, and a neck like that of the violin. The modern or Spanish guitar has six strings, the three highest of gut, the three lowest of silk covered with fine wire, and tuned to the E in the second space of the bass staff, A, its fourth, and the treble D, G, B, and E. The intermediate intervals are produced by bringing the strings, by the pressure of the fingers of the left hand, into contact with the frets fixed on the key-board, while those of the right pluck or twitch the strings. The Spaniards are supposed to be the inventors of the guitar, and it is most widely used in Spain, though its use is quite general in other countries.

Guiteau, gē-tō', Charles Julius, American assassin: b. about 1840; d. Washington, D. C., 30 June 1882. He became a lawyer in Chicago, and in 1880, after the election of James A. Garfield to the presidency, went to Washington, presumably to secure the office of United States consul at Marseilles, but did not succeed. Owing to this and the fact that the new President was opposed to the Stalwarts, led by Roscoe Conkling, Guiteau became greatly incensed. On 2 July 1881, he shot the President in the waiting room of the Baltimore and Potomac Railroad station in Washington; and on 19 Sept. the President died from the effect of his wound. Letters taken from Guiteau after his arrest showed that he had planned to "remove" the President. He was indicted for murder on 7 October, was found guilty on 25 Jan. 1882 after a sensational trial in which insanity was the only plea offered for the defense, and was hanged in the District of Columbia jail, 30 June following. See GARFIELD, J. A.

Guiuan, gē-wān, Philippines, a pueblo of Samar, on the extreme south coast, 78 miles southeast of Catbalogan, having a good harbor. On the edge of a reef near the town are several sulphur springs, which though covered by the sea at high tide, are never brackish. Pop. 11,300.

Guizot, François Pierre Guillaume, frānswā pē-ār gē-yōm gē-zō, French historian and statesman: b. Nîmes 4 Oct. 1787; d. Valricher near Paris, 13 Sept. 1874. His father, a lawyer, having in 1794 perished by the guillotine, his mother and her three sons retired to Geneva, where François was gratuitously educated at the gymnasium. In 1805 he commenced the study of law at Paris, but gradually drifted into the literary profession. In 1812 he married Mlle. de Meulan, editor of the 'Publiciste,' and became professor of history at the Sorbonne. On the fall of the empire he obtained several public offices, such as councillor of state, and director-general of the departmental and communal administration. In 1816 he published 'Du Gouvernement Représentatif et de l'Etat Actuel de la France,' and 'Essai sur l'Instruction Publique.' In 1820 the Duc de Berry was assassinated, and Guizot's party fell before an ultra-royalist reaction. In 1825 he lost his chair on account of the political character of his lectures, but regained it in 1828. In 1829 he again became councillor of state, and after the July revolution was appointed minister of the interior, but resigned in 1831. After the death of Périer, Guizot, along with Thiers and De Broglie, formed a coalition ministry, and rendered great service as minister of public instruction. He became ambassador at the British court in 1840, and next year was the real head of the government of which Soult was the nominal chief. He retained the office of minister of foreign affairs until 1848, and during that period opposed all measures of reform. After the fall of Louis Philippe, Guizot escaped, fled to England and though he returned the next year he henceforth practically retired from public life. Born of a Calvinist family, he always remained a stern Protestant of the orthodox type, although he zealously supported the temporal authority of the pope. Among his numerous works may be mentioned, 'Histoire de la Civilisation en France' (1830); 'Histoire générale de la Civilisation en Europe' (1828); 'Histoire de la Civilisation d'Angleterre' (1827); 'Washington'; 'Discours sur la Révolution d'Angleterre'; 'Méditations et Etudes Morales'; 'Guillaume le Conquérant'; 'Mémoires pour servir à l'Histoire de mon Temps' (1858-68); 'Méditations sur l'Etat Actuel de la Religion Chrétienne' (1865); 'Mélanges Biographiques et Littéraires'; 'Histoire de France Racontée à mes Petits Enfants' (1870); etc.

Gujarat, gūzh-rāt', or Guzerat, India, a region bordering on the Arabian Sea, comprising part of the northern section of the presidency of Bombay and some native states. Area of the whole, about 70,000 square miles; pop. about 11,000,000.

Gulf of Saint Lawrence. See SAINT LAWRENCE, GULF OF.

Gulf-stream. See CURRENTS, MARINE.

Gulfport, Miss., city in Harrison County, on the Gulf of Mexico, and the Gulf & Ship Island and the Louisville and N. R.R.'s. Gulfport has grown in 5 years from a seacoast hamlet to a thriving city. The keynote of its success is the fact that it has one of the best harbors on the Gulf of Mexico. Prominent among its public buildings is the "Great Southern" hotel, with its 250 rooms, intended as a winter resort for Northerners and as a summer

GULFWEED — GULLS

resort for the people of the South, especially those of New Orleans. It is situated directly on the shore and is undoubtedly the finest resort hotel between Tampa and New Orleans. Other prominent buildings are the county courthouse and those of the First National bank and of the Gulf & Ship Island railroad. The latter is used for the offices of the company. The First National bank is now the largest bank in the State of Mississippi, having a capital of \$250,000. The most important manufacturing plants are oil and fertilizer factories, the Gulfport Packing Company and the shops of the Gulf & Ship Island railroad. There are, also, numerous smaller concerns, such as iron foundries and wood-working plants. Pop. (1900) 1,020; (1910) 6,386.

Gulfweed, a genus (*Sargassum*) of seaweeds of the sub-order *Fucaceæ*, which grow in deep water along all warm coasts, and becoming easily detached, are found floating in immense quantities in the middle of all oceans, where they accumulate in vast eddies, as it were, of the oceanic currents. The North Atlantic species (*S. bacciferum*) is the best known, and takes its popular name from its presence in long yellow lines in the Gulf Stream; and its specific name from the berry-like appearance of its air-vessels. The frond is very long, and is furnished with distinct, stalked, nerved leaves, and simple axillary stalked air-vessels; and its structure approaches that of the higher plants. Where the Gulf Stream is deflected from the banks of Newfoundland eastward, and sends off its more southern branch toward the Azores, is situated the Sargasso Sea, "that great bank of weeds, which so vividly occupied the imagination of Christopher Columbus, and which Oviedo calls the seaweed meadows" (Humboldt). The quantity of floating seaweed is often such as to impede the progress of ships. Multitudes of small marine animals accompany it, with fishes ready to prey on them, constituting a distinct and considerable fauna. The gulfweed is eaten in China, and in other parts of the East also it is used in salads and as a pickle.

Gu'lick, John Thomas, American clergyman: b. Kauai, Hawaii, 13 March 1832. He was graduated at Williams College in 1856, studied theology at the Union Theological Seminary, went to China as a missionary, and subsequently to Japan. He is a well-known writer on topics relating to evolution and natural history. He contributed to the 'Journal' of the Linnæan Society of London: 'The Diversity of Evolution under One Set of External Conditions' (1872); 'Divergent Evolution Through Cumulative Segregation' (1887); 'Intensive Segregation' (1889); and other monographs.

Gulliver's Travels, a famous satire by Jonathan Swift anonymously published in 1727. It is one of the most brilliant and profound of satires, became immediately popular, and has never lost its interest for both young and old. It begins with Gulliver's account of himself and his setting forth upon the travels. A violent storm off Van Diemen's Land drives him, the one survivor, to Lilliput, where he is examined with curiosity by the tiny folk. His next voyage is to Brobdingnag, where he is a Lilliputian in comparison to the size of the gigantic inhabitants of this strange land, in

which he becomes a court toy. The next adventure is a voyage to Laputa, where the inhabitants are absorbed in intellectual and scientific pursuits, and "taken up with intense speculations," and their conduct is most eccentric; this is probably a satire upon pedantry. The last voyage takes the traveler into the country of the Houyhnhnms, where the horses under this name have an ideal government,—Swift's Utopia,—and are immensely superior to the Yahoos, the embodiment of bestial mankind.

Gulls, a large group of sea-birds found throughout the world and constituting, together with the terns (q.v.), skimmers (q.v.), and skuas or jaeger-gulls, the family *Laridæ* (q.v.). Some 53 species of gulls are known, ranging in size from that of a pigeon to that of a goose. The prevailing color is pure white below and pearl gray above, while some species have a gray or blackish head, and a few are dull gray all over. The young birds of all species are dusky during the first year. They walk with tolerable ease, and swim well, but are incapable of diving. They keep much on the wing, and their flight is rapid, strong, and long sustained, even in heavy gales. In sitting they contract their necks and rest on one foot. They nest along the shores in the grass, on rocky cliffs or rarely in small trees, forming the nest of dry grass, sedges, etc., and invariably in colonies, creating a great uproar when their nesting-grounds are visited. The wild characteristic note is, in the bigger species, harsh and querulous, in the smaller a "laughing" or screaming; the lesser skuas give vent to a curious mewling cry and the great skuas to a similar but deeper sound. At the breeding-quarters the utterances are naturally more agitated and shrill, and the parents hang excitedly above a visitor's head. "The food," says Evans, "consists mainly of fish, mollusks, crustaceans, and worms, but is varied in the stronger forms by small mammals, young birds, and eggs; the great black-backed gull undoubtedly attacks lambs and weakly ewes; carrion is not uncommonly devoured; and *Larus maculipennis* acts as a scavenger at Buenos Ayres, besides clearing the country of grasshoppers, and robbing the Cayenne lapwing of its insect booty. Skuas give chase to their smaller kin, and force them to disgorge the fishes they have just caught, while even solan geese are sometimes victimized; *Larus scopulinus*, moreover, which robs the oyster-catcher of New Zealand, is a further instance of parasitic habits. Insects and their larvæ, turnips, berries, and grain are also eaten by these omnivorous but useful creatures."

Most gulls are migratory and scatter far along the coasts during fall and winter in search of food. On the eastern coast of the United States are five species. The large herring-gull (*Larus argentatus*) breeds on the coast of Maine and winters to the southward, being abundant about all harbors and along tidal rivers from October to April. Associated with them are sometimes seen the larger black-backed gull (*L. marinus*). In summer are present the smaller black-headed or laughing gull (*L. atricilla*) which nests plentifully on the salt marshes of the Middle and Southern States. The Bonaparte's and ring-billed gulls (*L. philadelphia* and *L. delawarensis*) breed on our northern coasts. In the interior Franklin's gull (*L. franklini*) inhabits the lake shores and marshes of

GUM ARABIC—GUNBOAT

the upper Mississippi Valley; while on the Pacific coast occur several other species. In the arctic regions the most abundant gull is the great Burgomaster (*L. glaucus*), one of the largest species, which wanders some distance southward in winter. Two other species peculiar to the far north are the pure white ivory gull (*Pagophila alba*) and Ross's rosy gull (*Rhodostethia rosea*). The latter is one of the rarest of birds and one of the most beautiful, the whole under surface being suffused with pink and the neck surrounded by a dainty collar of gray. It has been seen in numbers only by the arctic explorers Murdoch and Nansen. The Kittiwake (*Rissa tridactyla*) is another species of circumpolar distribution, peculiar in lacking the hind toe. Several of these species are known on the coasts of Europe or Asia; and the gulls of other parts of the world present little that is peculiar. Large areas of coastal beaches and islands formerly inhabited by gulls in various parts of the world, but especially along the eastern coast of the United States, have been wholly depopulated of these beautiful and useful birds by the incessant robbery of their nests for the sake of the eggs—which are conical in form, and white or greenish, heavily blotched with purple and brown in color;—or for the sake of their plumage to be used in millinery trimmings. Protective laws now prevent this waste of life.

Consult Evans, 'Birds' (1900); Coues, 'Birds of the Northwest' (1874); Baird, Brewer and Ridgway, 'North American Water Birds' (1884).

Gum Arabic, a gum of the *Acacia arabica*, which grows in India and Arabia. Gum arabic can be obtained also from *Vachellia farnesiana* of India, a small tree closely allied to the true acacias. Gum arabic occurs in transparent white tears, which are often colored yellow or brown by impurities; it cracks on exposure to the air on the surface; it is brittle, and has a bland, mucilaginous taste. It dissolves in water, and the solution gives a precipitate of arabin on the addition of hydrochloric acid. Gum arabic contains about 70 per cent. of arabin, $2C_6H_{10}O_5 + H_2O$, and 17 per cent. of water; the rest consists of potash and lime, which are combined with the arabin.

Gum-boil, an abscess in the gum caused by inflammation, generally the result of toothache or of the presence of decayed teeth. The carious tooth or stump, if the inflammation proceeds from this cause, should be removed. When matter has formed it should be evacuated by a free incision, and the mouth should be frequently washed with tincture of myrrh and water. See DENTISTRY; TEETH.

Gum-resins are complex mixtures obtained from plants. They contain both a gum, which is soluble in water, and a resin, which dissolves in spirit. There are usually present in addition essential oil, coloring and extractive matter, and a variety of impurities. The gum-resins have frequently a strong and characteristic taste and smell. They are solid, opaque, and brittle. The common gum-resins are aloes, ammoniacum, asafoetida, euphorbium, galbanum, gamboge, myrrh, olibanum, opoponax, sagapenum, and scammony.

Gum-trees, a name for several different trees: (1) those of the Australasian genus

Eucalyptus (q.v.); (2) in the United States, the pepperidge or tupelo, various species of which are called black, sour, cotton-gum, etc. (see TUPELO); (3) the liquid amber (q.v.).

Gumbinnen, goom-bin'nën, Prussia, the capital of a government with an area of 6,125 square miles. The town is on the Pissa, 22 miles by rail southwest of Edytukhnen on the Russian frontier. It is comparatively modern, its municipal charter dating from 1722. There are manufactures of woollens and linens, and a trade in cattle and agricultural produce. Pop. about 15,000.

Gumbo. See HIBISCUS; OKRA.

Gumma, güm'a, a tumorous deposit that occurs in the tertiary stage of syphilis (q.v.). It affects most frequently the bones, cartilages, skin, and periosteum. They are made up of a hard connective tissue which tends to undergo softening, causing destruction of the part and deep ulceration if near the surface. The periosteum of the cranial bones is particularly liable to be affected, causing dangerous pressure on the brain.

Gumming, or Gumosis. See DISEASES OF PLANTS.

Gums, various mucilaginous substances, generally obtainable from the sap of trees. They are soluble either in cold water or in alcohol. Many aromatic products such as are employed in making perfumes and incense are to be classed as gums. Gum Arabic is the best known among such products. It is obtained from the Senegal *Acacia* in Western Africa. There are no less than eight or nine varieties of this gum. Gum tragacanth comes from the *Astragalus gummifer*, in Western Asia. Cherry-tree gum, whose name tells its origin, is used for stiffening felt, as in hat making. There are some gums which might perhaps more properly be classed as resins, and are sometimes styled gum-resins; many of which are used in medicine.

Gun, a strongly-constructed metal tube, from which destructive projectiles are expelled by the gradually increasing pressure of gas, evolved from fired gunpowder or other explosive. The term comprehends every description of firearm, from cannons, mortars, and other heavy pieces of ordnance, to the fowling-piece, rifle, and pocket-pistol. See ARMS; ARTILLERY; FIRE-ARMS; ORDNANCE.

Gunboat, a term originally applied to small craft mounting usually a single gun, and employed exclusively in the defense of coasts and rivers. Experiences in the Crimean war suggested the extension of the use of gunboats to offensive warfare. One of the main objects of a ship of war being to carry guns, it was thought that a vessel large enough to carry only a single gun of the largest size would, from the rapidity with which it could be manoeuvred, and its comparative immunity from shot, have great advantages in attack against large vessels carrying a heavy armament, and requiring much room and time to manoeuvre. About 1860 the British government constructed about 200 gunboats upon this principle. They were about 100 feet long, with 22 feet beam, and a draught at load-line of 6½ feet. Each was armed with one deck-gun, a 68-pounder, which, by turning on a pivot, could

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be used either ahead, astern, or in any other direction; while the facility of manœuvring was further enhanced by the rapidity with which the vessel itself could be turned almost in her own length. Experience soon proved that there were serious defects in this species of armament. One of these was, that from being obliged to carry their guns constantly on deck the gunboats were liable to be top-heavy and untrustworthy in a heavy sea.

A new gunboat was designed in England in 1868 by G. Rendel, the chief peculiarity of which was the placing of the gun on a platform, which could be raised to the deck or lowered to the hold by a donkey-engine. The gun did not turn on a pivot, the manœuvring being effected entirely by the turning of the vessel, to effect which it was fitted with twin-screws worked by independent engines. Other types of gunboat have since been constructed for the British navy. One of a recent and powerful type is 165 feet in length, with a breadth of 31 feet, and a displacement of 805 tons. It draws 11 feet 7½ inches of water, and has triple-expansion engines, working up to 1,200 horse-power, with a speed of 13 knots an hour. It carries six 4-inch steel breech-loading guns, besides two quick-firing guns and machine-guns, and is bark-rigged. A number of what are known as torpedo gunboats have been constructed for the British navy. One boat of this class is 200 feet in length, with a beam of 23 feet, and a depth of 13 feet. It is built entirely of steel, has a torpedo-tube through the bow and another through the stern in a fore-and-aft line, and one on each broadside forward, a 4-inch 25-cwt. central-pivot breech-loading gun, and six 3-pounder, quick-firing guns. It has two sets of triple-expansion engines, working up to 2,700 horse-power, and enabling the vessel of 450 tons to steam over 18 knots an hour. Several first-class gunboats of a more recent type are twin-screw vessels, 180 feet long, of 700 tons displacement, armed with two 4-inch guns and four 12-pounder quick-firing guns.

In the United States the gunboat figured to a very considerable extent in coast and lake warfare in our first two wars. They were first used on the Delaware River, in 1775-6, and drove the British frigate *Reliance* out of the roads. In December 1807 there were 69 of them in United States service, and the Congress ordered 188 more built, as an auxiliary to the embargo declared a few days later, making 257 in all. Improved ordnance has made them valueless, and they had a bad effect on the service, but there was strong opinion in their favor at the time, and they did good service in the War of 1812. The theory was that these movable batteries could act in water where large vessels could not, could be concentrated against the latter so as to afford as large an armament, yet present only a number of small targets, while their antagonist presented only one large one; that shots aimed too high would do no harm to gunboats, but would injure masts and rigging of frigates; that loss of rudder and sailing gear, the most crippling of accidents to a ship, could not happen to the gunboats, propelled and steered by sweeps; that nearness to the water level gave the guns more accurate aim; and that 75 gunboats could be built for the cost of one 36-gun frigate.

In 1903 the United States navy had 20 of the ordinary gunboats in commission and about 60 torpedo-boats and destroyers of the gunboat type. Great Britain in 1902 had 33 torpedo gunboats, Germany 3, and France 15. In most countries the gunboat has been superseded by modern torpedo-boats and destroyers.

Gun-carriage, or Gun-mounting. See ARTILLERY; FORTIFICATION; ORDNANCE.

Guncotton is the name originally assigned to the material produced by Schoenbein, of Basle, Switzerland, in 1845 by treating cotton with a mixture of strong nitric and sulphuric acids. The discovery that starch, woody fibre, and similar substances give rise to the formation of highly combustible bodies when acted upon by concentrated nitric acid is attributed to Braconnot in 1832, and he styled the bodies so produced generically *xyloidine*. Six years later Pelouze took up this subject and extended his investigations to the behavior of cotton, paper and vegetable substances generally, and later Dumas prepared from paper by this means the substance which he called *nitramidine*. No practical result followed these observations until the discovery by Schoenbein of the advantages which followed the use of the acid mixture; a discovery which was also independently made by Boettger, of Frankfort, in 1847 and by Knop, of Hanover, and Taylor, of England, in 1847. The discovery aroused the liveliest expectations which were stimulated by the facts that the explosive was much more powerful than gunpowder and that when used as a propellant, it gave little or no smoke. Experiments and tests were begun shortly after with the new explosive in Germany, France, Austria, England, Russia, and the United States with a view of utilizing it as a substitute for gunpowder in guns. Unfortunately the material, as manufactured, was found to be not only so irregular in action that it was likely at any time to burst the piece, but also so unstable as to give rise to numerous accidents so that, especially after the serious and, at the time, inexplicable explosions at Vincennes and Bouchet in France, and Faversham in England, the experiments were discontinued except in Austria, where Baron von Lenk gave the matter close and long-continued study and came to the conclusion that the grave defects noted were not inherent in the material, but were due to the imperfect and irregular methods of manufacture, the failure to purify the cotton before treatment with the acid, and the failure to purify the guncotton and free it completely from acids after treatment. Following these convictions he improved the method of manufacture to such an extent that in 1862 the Austrian army had 30 batteries provided with guncotton cartridges made up by twisting the fibre into yarns which were braided together, but the spontaneous explosions at the magazine at Simmering in 1862 and at Steinfeld in 1865, together with the fact that the guncotton cartridges still gave at unexpected times abnormal pressures led to its further use in Austria being interdicted.

Von Lenk's process of manufacture was patented in England in 1862 and the Prentice Brothers began manufacturing under this process in 1864. In 1865 Abel patented an improvement of the process which was so successful in use that it gave guncotton a prominent and

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permanent place among explosive substances, and this process is followed to-day. The cotton when treated with the acid is in the fibrous condition which so well characterizes it, and under the microscope these fibres are seen to be hollow so that each is really a capillary or hair-like tube. Von Lenk had shown that cotton contains not only cellulose as the main component of its structure but that there were smaller and variable quantities of other substances naturally present besides foreign bodies accidentally present, and that it was necessary to get the cellulose in a pure and dry condition before treating it with acid. He, too, with others, had proved that the purity, strength and proportions of the acids used and the time and temperature of immersion of the cotton in the acid mixture affected very materially the character of the substance produced, while it was essential that every trace of free acid should be removed from the product, since a most minute quantity of sulphuric acid acts continuously and cumulatively on the guncotton and causes a progressively increasing rate of decomposition. Yet von Lenk and all others up to this time produced the guncotton in the same long staple form as the cotton from which it was made. It was evident to Abel's mind that as the dry cotton was immersed in the acid mixture the capillary tubes, of which it was composed, would suck up the liquid acid and retain it with such force and in such a manner as to make its removal by wringing, or washing with or in water or by neutralization with alkalis, extremely difficult and uncertain, and to remedy this Abel proposed to pulp the guncotton through which the fibres would be cut into such short lengths that the acids could be completely and readily removed from the interiors of the tubes while furthermore this pulped material could by molding and pressure be shaped into any desired forms and dimensions.

Abel's process for the manufacture of military guncotton as carried out at the United States naval torpedo stations was as follows: The cotton used was what is known as "cop" or weaver's waste, which is the tangled clippings from the spinning room of a cotton mill; the thready form of this material being preferred to the fluffy form of the unworked cotton. This was first hand-picked to remove the larger foreign bodies present and to open out after baling. It was then boiled in 200-pound lots in caustic soda solution to remove grease, oils and the incrusting substances on the fibres, then wrung out in a centrifugal wringer and dried in a heated closet. It was then put through a cotton picker to open up the fibre and remove foreign bodies which had been overlooked in the hand-picking, and was then dried in a second closet at 225° F. until it contained not over one half per cent of moisture, when it was stored in small lots in hermetically sealed metal vessels to cool. It was then dipped in lots of one pound each in 150 pounds of acids, consisting of 1 part by weight of nitric acid, 1.5 specific gravity, to 3 parts by weight of sulphuric acid, 1.845 specific gravity, contained in a large iron trough about which cold water circulated so as to maintain a temperature of 70° F. throughout the dipping. The cotton was plunged rapidly under the acid, allowed to remain immersed for 10 minutes, removed to a shelf above the acid dipping trough, where

it was squeezed to remove the excess of acid, and then at once transferred to a two-gallon crock made of acid-proof earthenware. As transferred to this digestion crock the cotton carried with it from 10 to 12 pounds of the acid mixture, and by pressing the mass down in the crock with an iron tool, the cotton was forced to the bottom and covered with a layer of the acid mixture which was squeezed from it. The crock was then covered and placed in a wooden trough where it was partly surrounded with cool water, which was kept in constant circulation, and where it was allowed to remain, so that the cotton could "digest" the acid, for 24 hours. Then the contents were thrown into a steel centrifugal wringer by which the greater part of the acid was removed. The guncotton was then thrown into a tub holding 800 gallons of water through which a large stream of water was continually flowing and in which a large paddle-wheel was in revolution so as to very quickly bring the acid guncotton into contact with so large a volume of cold water as to prevent its becoming heated. The guncotton was then boiled twice for eight hours each in a dilute solution of soda, wrung out and washed with fresh water and put in the pulper. This was an ordinary "beater," "rag-engine," or "Hollander," such as is used in the paper-making industry, and the guncotton, suspended in water, was subjected to the action of the machine for two days in charges of from 300 to 350 pounds, where, by the shearing action of the knives, the fibres were cut into short lengths and the guncotton was reduced to the fineness of cornmeal, and mixed into a pulp with the water present. This was drawn into a large tank, known as the poacher, where the powdered guncotton was allowed to settle and the supernatant water drawn off. Fresh water was added and, by means of a revolving paddle in the poacher, the guncotton was mixed with it and washed by it, and this washing was repeated six or seven times until the chemical test of a sample showed that the acid had been completely removed. Then it was treated with a solution of lime containing a small quantity of caustic soda and also of precipitated chalk, and the mass was ready for molding.

As shown above the first use to which guncotton was put was as a propellant in guns, and Abel devised means for making powder grains from the pulped guncotton, but he soon pointed out the advantages which it possessed, when compressed, for use in military and naval mines and torpedoes and for engineering operations in times of war, and these are the chief uses to which it has been put. To compress it the alkaline solution from the poacher, containing the finely divided guncotton in suspension, was pumped up to a stuff-chest, which is a cylindrical tank containing a vertical shaft armed with paddle-blades which, by revolving, keeps the guncotton in suspension. From here, by means of a wagon, the pulp was run into a hydraulic press where it was subjected to a pressure of 100 pounds to the square inch and thereby molded into blocks. These blocks were then transferred to another press where they were subjected to a pressure of from 6,000 to 6,800 pounds to the square inch. As made at the United States naval torpedo stations the blocks from the molding press were prismatic, with the vertical edges chamfered, 2.8 inches in

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diameter by $5\frac{1}{4}$ to $5\frac{1}{2}$ inches high, with a circular hole $\frac{1}{2}$ inch in diameter, produced by a mandrel in the press, running vertically through the centre of the prism. After final pressing the blocks were 2.9 inches in diameter by 2 inches high, the hole remaining practically unchanged, and they still contained from 12 to 16 per cent of water, though as sent out into the service as "wet guncotton" they were soaked in water until they contained 35 per cent. In the final press by means of steel dies, inscriptions in letters and figures, such as the place and date of manufacture and factory lot, were placed upon each block.

In the fibrous condition guncotton appears like the cotton from which it is made, but it has a harsher feel and it becomes electrified by friction when dry. When dry if rubbed in the dark it becomes phosphorescent. Under the microscope by polarized light it exhibits colors, while cotton is colorless. Pure guncotton is without odor or taste and is insoluble in water. The gravimetric density before pulping is 0.1, after pulping 0.3, and after compression from 1.0 to 1.3, but by excessive pressure it has been raised to 1.4. The real specific gravity of guncotton is 1.5. When dry, compressed guncotton is detonated by inserting a detonator in the hole in the block and firing it. Wet guncotton is detonated by the detonation of a block of dry guncotton fired in contact with it. The violence of the explosion of guncotton when thus detonated is comparable with, if not superior to, that of nitroglycerin. Dry guncotton may be set on fire and, when compressed, it burns so slowly in the open that the fire may be extinguished by pouring water upon it. Wet guncotton, thoroughly saturated with water, can be shaped by a tool without taking fire or exploding. In forming the cylindrical and conical charges for the torpedoes thrown from the pneumatic guns of the United States steamship *Vesuvius* at Santiago, the prismatic blocks above described were sawn with a band saw, turned in a lathe and cut with chisels as wood is treated, but care was used to keep the blocks and dust wet throughout the process.

Pure cotton is composed of cellulose having a formula which chemists believe to be some multiple of $C_6H_{10}O_5$. When it is acted upon by nitric acid or mixtures of nitric with sulphuric acid, under the proper conditions, cellulose nitrates are produced through, it is believed, the replacement of hydrogen atoms in the molecule by NO_2 groups, thus forming esters or organic salts. Views differ as to the number of cellulose nitrates existing but, following Vieille, who is the most widely accepted authority on this point, taking the formula of cellulose as $C_{24}H_{40}O_{22}$ we may have the following:

Cellulose Nitrates	Percent of Nitrogen	Weight obtained from 100 parts of Cellulose
Cellulose endecanitate...	13.47	176.4
Cellulose decanitate....	12.75	169.4
Cellulose enneanitate...	11.96	162.5
Cellulose octonitate....	11.11	155.7
Cellulose heptanitate...	10.18	148.6
Cellulose hexanitate....	9.15	141.7
Cellulose pentanitate...	8.02	134.7
Cellulose tetranitate....	6.76	127.8

There are probably existing also isomers of many of the nitrates given in the table. Following their differences in composition these different cellulose nitrates have different properties especially as regards their solubility in organic solvents. Thus all except the endecanitate, if properly made, are soluble at ordinary temperatures in a mixture of one volume of alcohol and two volumes of ether. Such cellulose nitrates are called *pyroxyline*, *nitrocotton*, *soluble guncotton*, and *collodion*, *cotton* or *guncotton*. The decanitate is also called *pyrocellulose*. All the cellulose nitrates are by some called *nitrocellulose*. The material produced by the Abel process described above is partly soluble, but mostly insoluble in the ether-alcohol mixture, and to this material the name *guncotton* or better *military guncotton* is applied. In addition to guncotton, the cellulose nitrates are used in the manufacture of smokeless powder, explosive gelatine, pyroxylin plastics, pyroxylin varnishes, photographic films and collodion. For smokeless powders and explosive gelatine the deca- and enneanitrates are most largely used. For varnishes, collodion and photographic films the octonitate is generally employed. And the heptanitate, which is of low nitration, is preferred for the pyroxylin plastics. This last nitrate may be made by dipping one pound of pure dry cotton or tissue paper in 100 pounds of a mixture of 66 parts of sulphuric acid, 17 parts of nitric acid and 17 parts of water, and continuing the immersion at 30° C. for 20 to 30 minutes. The acid is then wrung out and the nitrate washed and neutralized. The higher nitrates are made by using stronger acids, longer exposures and higher temperatures. In making pyroxyline varnishes, which are largely used in coating metals, artificial leather and in waterproofing, the pyroxylin is dissolved in ethyl acetate, amyl acetate and similar organic solvents.

Collodion, which is used in surgery, is made by placing 30 grams of pyroxylin in a suitable bottle, pouring upon it 750 cubic centimetres of ether, corking the bottle and allowing the whole to stand 15 minutes. Two hundred and fifty cubic centimetres of alcohol are then added and the bottle shaken until the pyroxylin is dissolved. On allowing to stand the solution becomes clear, and if poured upon a flesh wound the solvents evaporate and a continuous film of pyroxylin is formed which protects the wound from the air and which also, by contracting as it dries, brings the edges of the wound together. Substances such as cantharides, tannic acid and the like, by which to produce blistering, styptic and other effects, may be added to the collodion. See EXPLOSIVES.

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Gunnery.—Gunnery is the art and science of using guns. The principles of ballistics necessarily play an important part in the science of gunnery, and it is necessary to have a practically exact knowledge of the effect of air resistance upon the motion of projectiles before satisfactory practical results can be obtained. Fortunately many experimental firings have been made with this object in view. Among them may be mentioned the firings with spherical projectiles by the Metz Commission, in 1839-40, and again in 1856-58; and the names of Didion and Saint Robert are associated with

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laws deduced from these firings. Other firings with more modern projectiles were made in Russia in 1868-9 and in England in 1866-70. The Krupp firings were made at Essen, Germany, in 1875-81; and some firings were conducted in Holland in 1884. Firings were made at Gåvre, France, and the results are accessible in Charbonnier's "Traité de Balistique Extérieure," 1905. Firings at Shoeburyness, England, in 1904-6, gave excellent data with regard to modern projectiles; and the Krupp firm has made and recorded the results of many firings.

Various practical formulas have been devised as the results became available, and formulas are associated with the names of Didion, Saint Robert, Mayevski, Hojel, Bashforth, Zabudski, Siacci, Chapel, Vallier and Scheve. These formulas presented more or less accurately the resistance of the air in terms of the velocity, air density and projectile characteristics.

The peculiarities of the law of air resistance are best shown by considering the fact that Newton, upon hypotheses not altogether accurate, found that the resistance of the air varied as the square of the velocity. To show the effect as actually found in the firings, the law of air resistance will be placed in the form (See article BALLISTICS)

$$F(v) = Kv^2$$

and the value of K as the result of the most reliable experiments will be shown. We distinguish

- (a) The firings of the Gåvre Commission.
 - (b) The English firings of 1904-6.
 - (c) The English and Russian firings of 1866-70.
 - (d) The Dutch firings of 1884.
 - (e) The Krupp firings of 1875-81.
- and tabulate below the values of 10000 K in order to avoid ciphers.

10000 K

v	(a)	(b)	(c)	(d)	(e)
300....	.461	.749	.620	—	.170
600....	.414	.568	.413	.471	.469
900....	.528	.531	.562	.648	.607
1200....	1.156	1.129	1.157	1.133	1.134
1500....	1.355	1.365	1.344	1.347	1.314
1800....	1.325	1.316	1.319	1.304	1.314
2100....	1.252	1.258	1.263	1.274	1.266
2400....	1.178	1.177	—	—	1.219
2700....	1.123	1.117	—	—	1.168
3000....	1.083	1.078	—	—	—
3300....	1.056	1.045	—	—	—
3600....	1.041	1.015	—	—	—
3900....	1.033	.989	—	—	—

It thus appears that K is by no means constant. It is to be noted that, at the low velocities, the results are discordant, due to the difficulty of accurately measuring the small differences in velocity in finding the retardation. At the highest velocities the discrepancies are probably due to the conclusions being drawn from a relatively small number of shots. Considering the wide intervals of time separating the firings, the results are remarkably consistent.

As already indicated, various laws have been deduced from one or more sets of firings but a comparison of them shows considerable discrepancy and none of them is consistent with the firings quoted when they are all considered.

In most cases attempts have been made to produce simplicity rather than extreme accuracy. This presents advantages in computation without necessarily sacrificing practical accuracy. In other cases the formulas are prohibitively complex. In the case of the Gåvre firings no attempt at formulation was made and the integrations were performed by quadratures.

A careful consideration of the data here quoted in brief, leads to the conclusion that the desired simplicity and all accuracy that is possible (in a case where the true law is not exactly known but must be inferred from the firings themselves) will be secured by employing expressions of the form

$$F(v) = Av^n$$

using a number of values of A and n sufficient to reproduce the mean results of firings with accuracy. The values of A and n are tabulated together with the limits of velocity between which they hold.

Velocity limits	$\log A$	n
0 to 723.....	5.67368-10	2.0
723 to 904.....	3.10040-10	2.9
904 to 1000.....	1.03105-10	3.6
1000 to 1198.....	7.20620-20	4.875
1198 to 1325.....	2.36265-10	3.2
1325 to 1497.....	5.06995-10	7/3
1497 to 1630.....	6.12840-10	2.0
1630 to 2000.....	6.84220-10	16/9
2000 to 2589.....	7.65989-10	1.53
2589 to 3276.....	7.19313-10	5/3
3276 to 4000.....	6.80254-10	16/9

When the laws are in these forms the processes of computation by Siacci's method for direct fire are greatly simplified since we then have

$$S(u) = \frac{1}{(n-2)Au^{n-2}}$$

(except when $n=2$, when it takes the form

$$S(u) = -\frac{\log e u}{A})$$

$$T(u) = \frac{1}{(n-1)Au^{n-1}}$$

$$I(u) = \frac{2g}{nAu^n}$$

$$A(u) = \frac{g}{n(n-1)A^2u^{n-2}}$$

$$\left[\begin{array}{l} \text{When } n=2 \\ A(u) = \frac{g}{2A^2u^2} \end{array} \right]$$

and the principal and secondary tables may be calculated by using these expressions with the values of A and n belonging to the value of u under consideration, u being here treated as if it were v . (See article on BALLISTICS.)

Having the principal and secondary tables it is at once practicable to predict what will be the behavior of a given projectile under assumed conditions. It is usual in direct fire to have what is called a range table, calculated for average air density and presuming a certain projectile and muzzle velocity. The table gives, for different ranges or distances at equal intervals, the angles with the horizontal at which the projectile is launched, and has a number of

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other columns giving the time of flight, the angle of fall, the maximum height to which the projectile ascends, the striking velocity, the perforation of armor, in inches; the effect on the range, of an accelerating or retarding wind, of a density of the air different from that presumed in the table, and of a change in muzzle velocity. The deviating effects of cross-wind and drift are also given, usually in degrees.

The character of the range-table and of the information which it contains will be influenced by the mount and surroundings. Naval guns will need a different form of range table from that required for coast defense guns, because of the stable platform of the latter as compared with the rolling and pitching platform afforded by the warship. This makes it necessary to discuss the several methods of fire; but before doing so it will be necessary to consider equations already deduced in the article on BALLISTICS. It was there found that

$$\frac{\tan \epsilon}{\tan \phi} = 1 - \frac{aC}{\sin 2\phi}$$

and if ϵ is the angular elevation of a point distant x feet from the gun, and y feet above its level, and if ϕ_x is the value of ϕ which would place the projectile at the foot of the ordinate y then

$$\sin 2\phi_x = aC$$

and

$$\frac{\tan \epsilon}{\tan \phi} = 1 - \frac{\sin 2\phi_x}{\sin 2\phi}$$

or, if all the angles are small

$$\frac{\epsilon}{\phi} = 1 - \frac{\phi_x}{\phi}$$

or

$$\phi_x = \phi - \epsilon$$

This amounts to saying that in order to shoot at a point above or below the level of the gun the line of sight (which is the line from the eye through the sights and the target) must make with the axis of the bore of the piece the angle given in the range table for the distance at which the target is. This idea is familiar to every one who uses small arms, the angle being set off by a leaf graduated in ranges and constituting the rear sight of the gun. The same condition obtains in the case of naval and field artillery guns, which use a sight graduated in ranges, aim being taken in a similar manner. Where, however, a gun is mounted on land on a permanent carriage, at a fixed height above the water, the range-scale is usually much larger and is graduated to correspond to values of ϕ rather than $\phi - \epsilon$, and the scale is set by a man who attends to this alone while the gun pointer is concerned only with following the target horizontally. This independence of function is a great advantage. On movable platforms, such as ships, independence is sought by means of two telescopic sights, one for the pointer who follows the target horizontally and the other for a second pointer who follows it vertically. It is easily seen that where a single gun pointer has to do both, good shooting is exceedingly difficult.

The error committed by assuming the simple relation

$$\phi_x = \phi - \epsilon$$

may be ascertained by substituting this value for ϕ_x , obtaining the equation

$$\frac{\tan \epsilon}{\tan \phi} = 1 - \frac{\sin 2(\phi - \epsilon)}{\sin 2\phi}$$

or

$$2 \cos^2 \phi (\tan \phi - \tan \epsilon) = \sin 2(\phi - \epsilon)$$

and it is at once seen that this equation is true when

$$(a) \quad \phi = \epsilon$$

$$\text{or } (b) \quad \epsilon = 0$$

These conditions are approximately realized in direct fire with high velocities. They are not generally realized in curved or high angle fire, the former condition being never realized on account of the low muzzle velocities employed. The actual error in ϕ in any case may be found by assuming ϕ and ϵ and calculating $\sin 2\phi$ from the relation

$$\sin 2\phi = \frac{\sin 2(\phi - \epsilon)}{1 - \frac{\tan \epsilon}{\tan \phi}}$$

the assumed values of ϵ and ϕ being used in the second member to calculate $\sin 2\phi$, and thence ϕ to be compared with the assumed ϕ .

The actual calculation of ϵ , the angle of position, is needed only in the case of sea coast guns mounted on a stable platform on land. The value of ϵ in that case is found from the height of the gun above the water increased by the curvature of the earth in feet for each range. The curvature in feet may be readily calculated and is given by the formula

$$K = [3.33333 - 10]R^2 \\ = 0.2154 \left(\frac{R}{1000} \right)^2$$

R being the range in yards, and K the curvature in feet. If h be the height above the water,

$$y = -(h + K)$$

and

$$\tan \epsilon = - \frac{(h + K)}{3R}$$

The curvature for various ranges is given in the following table:

R (yds)	K (feet)	R (yds)	K (feet)
1,000	0.22	9,000	17.45
2,000	0.86	10,000	21.54
3,000	1.94	11,000	26.06
4,000	3.45	12,000	31.02
5,000	5.39	13,000	36.40
6,000	7.75	14,000	42.22
7,000	10.55	15,000	48.47
8,000	13.79	16,000	55.14

Using these values of ϵ for the different ranges, the elevation ϕ for the range scales is found and applied. The range scales having been graduated for the conditions presumed in the range-table, it is next necessary to find and provide for the application of corrections to be made in order to lay the gun properly for the actual atmospheric and other conditions that obtain at the time of firing. In the case of naval and field artillery guns differential formulas suffice, as they must rely largely on ob-

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servation of the fall of the shots, in applying corrections. In the case of field artillery operating in mountainous country the height above sea-level, in the absence of readings of barometer and thermometer, should be considered, as it makes a great deal of difference amounting in a 3-inch gun with 1700 f. s. muzzle velocity to a range increase given by

$$\frac{Rh}{80000}$$

in which h is the height above sea level in feet and R the range in yards. Thus, at a range of 5000 yards, the effect is 500 yards for a height of 8000 feet above sea level.

The effect of the barometer and thermometer readings on the ballistic coefficient is shown in the table of values of $\frac{\delta_1}{\delta}$ given below. (See article BALLISTICS.)

Values of $\frac{\delta_1}{\delta}$

Thermometer Fahr.	Barometer Inches			
	28	29	30	31
-20°	.89	.86	.83	.81
-10°	.91	.88	.85	.82
0°	.93	.90	.87	.84
10°	.95	.92	.89	.86
20°	.97	.94	.91	.88
30°	.99	.96	.93	.90
40°	1.02	.98	.95	.92
50°	1.04	1.00	.97	.94
60°	1.06	1.02	.99	.96
70°	1.08	1.04	1.01	.98
80°	1.11	1.07	1.03	1.00
90°	1.13	1.09	1.06	1.02
100°	1.16	1.12	1.08	1.04

In order to obtain in a general way a conception of the effect produced by atmospheric conditions it will be desirable to note that for velocities between 4000 and 1500 feet per second average values of A and n may be taken as a basis for differential formulas, thus essentially covering the case of powerful seacoast and naval guns.

Between 1700 and 500 feet per second an average will be used to cover the case of field guns and between 800 and zero the values of A and n are constant. The value of n averages about 1.7 for high power guns; and about 3.0 for direct fire field guns.

Placing

$$AV^{n-2} \frac{X}{C} = m$$

we find from the secondary functions for the point of fall,

$$\frac{V^2 \sin 2\varphi}{gX} = \frac{1}{n(n-1)m^2} \left\{ (1 + (n-2)m) - \frac{2n-2}{n-2} - 2(n-1)m \right\}$$

and this expression assumes very simple forms for $n=4$ and $n=4/3$ giving for $n=4$

$$\frac{1}{M} = \frac{V^2 \sin 2\varphi}{gX} = 1 + \frac{2}{3}m = 1 + \frac{2}{3}AV^{n-2} \frac{X}{C}$$

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and for $n=4/3$

$$M = \frac{gX}{V^2 \sin 2\varphi} = 1 - \frac{1}{3}m = 1 - \frac{1}{3}AV^{n-2} \frac{X}{C}$$

As these equations each contain only V , φ , X , and C , it is plain that differential formulas for range changes may be readily found as follows:

for $n=4$

$$\frac{2dV}{V} + \frac{d \sin 2\varphi}{\sin 2\varphi} - \frac{dX}{X} = \frac{1-M}{M} \left\{ (n-2) \frac{dV}{V} + \frac{dX}{X} - \frac{dC}{C} \right\}$$

and for $n=4/3$

$$\frac{2dV}{V} + \frac{d \sin 2\varphi}{\sin 2\varphi} - \frac{dX}{X} = (1-M) \left\{ (n-2) \frac{dV}{V} + \frac{dX}{X} - \frac{dC}{C} \right\}$$

Placing the coefficient of the second member equal to Q we may write generally

$$\frac{2dV}{V} + \frac{d \sin 2\varphi}{\sin 2\varphi} - \frac{dX}{X} = Q \left\{ (n-2) \frac{dV}{V} + \frac{dX}{X} - \frac{dC}{C} \right\}$$

and by interpolating in the denominator of Q , we find

$$Q = \frac{8(1-M)}{3M(4-n) + 3n-4}$$

in which

$$M = \frac{gX}{V^2 \sin 2\varphi}$$

Placing

$$\frac{1}{1+Q} = L$$

so that

$$L = \frac{3M(4-n) + 3n-4}{M(4-3n) + 3n+4}$$

the differential formula assumes the form

$$\frac{dX}{X} = (1-L) \frac{dC}{C} + L \frac{d \sin 2\varphi}{\sin 2\varphi} + \left\{ 2-n(1-L) \right\} \frac{dV}{V}$$

Knowing V , φ , and X , and using the mean n applicable in the case, the change in range incident to a change in V , φ , or C may be found. C may change due to several causes since

$$C = \frac{\delta_1}{\delta} \cdot \frac{w}{id^2}$$

so that

$$\frac{dC}{C} = \frac{d \frac{\delta_1}{\delta}}{\frac{\delta_1}{\delta}} + \frac{dw}{w} - \frac{di}{i} - \frac{2dd}{d}$$

In case the weight of the projectile changes, and the powder charge remains the same, an increase in w will increase C , but diminish V . If the charge is changed to meet the change in w and keep V the same, it is only necessary to consider the change in C . Changes in the powder charge and projectile affecting V will be considered later.

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Where the gun is fixed in position incremental changes in range as a result of changes in V and C are calculated by working out separate range tables presuming a changed V or C ; and the results are applied in practice to the range scales by suitable mechanical computations. The corrections must also include the effects of a change in the height of tide, of an accelerating or retarding wind, and of travel of a moving target during the time of operation. The accuracy obtainable with a system of this character is illustrated by recent firing at Fort Monroe with two 12-inch guns fired at a moving target 5 miles distant, the battery actually firing seven out of eight shots through a net screen 20 yards long and 10 yards high, in 4 minutes 31 seconds, the projectiles weighing half a ton each.

The effect of wind on range and across the range is readily determined by considering the relative motion of the air particles and the projectile, the entire problem being one of vectors; the effect on the range of a wind blowing W feet per second is that due to a change in velocity and one in elevation given by the expressions

$$\begin{aligned} dV &= -W \cos \varphi \\ d\varphi &= + \frac{W \sin \varphi}{V} \quad (d\varphi \text{ in radians}) \end{aligned}$$

the wind W being an accelerating component, the travel of the wind in the time of flight is WT feet and the total effect is therefore given by

$$\begin{aligned} \frac{\Delta X}{X} &= \frac{WT}{X} - \frac{W \cos \varphi}{V} \left\{ 2 - n(1-L) \right\} \\ &+ \frac{W \sin \varphi}{V} \times L. \end{aligned}$$

The effect of a cross wind W is simpler in form and is given by

$$D = W \left(T - \frac{X}{V \cos \varphi} \right)$$

Cross effects are best expressed as angles as they are so observed at the battery. The value of the deflection in radians is, therefore,

$$\frac{D}{X} = \frac{W}{V \cos \varphi} \left(\frac{V T \cos \varphi}{X} - 1 \right).$$

and in degrees

$$\text{Deflection} = \frac{W}{V \cos \varphi} \left(\frac{V T \cos \varphi}{X} - 1 \right) \frac{180^\circ}{\pi}$$

There is one other deflection, called drift, which is caused by the combined action of gravity, air resistance, and the rotation of the projectile about its longer axis. The results of the forces acting are essentially

- (a) A retarding force.
- (b) A deviating force.
- (c) A disturbing couple.

We are, in practice, principally concerned with the deviating force, which may be shown to cause a lateral acceleration

$$\frac{d^2 z}{dt^2} = (1-K) \frac{2gV}{n} \cdot \frac{d^3}{w} \cdot \frac{\cos \theta}{v}$$

Upon noting that (see BALLISTICS)

$$\frac{vd\theta}{dt} = -g \cos \theta$$

we find

$$\frac{d^2 z}{dt^2} = -(1-K) \cdot \frac{2V}{n} \cdot \frac{d^3}{w} \cdot \frac{d\theta}{dt}$$

or upon integration between φ and θ

$$\frac{dz}{dt} = (1-K) \cdot \frac{2V}{n} \cdot \frac{d^3}{w} (\varphi - \theta)$$

In the above expressions $(1-K)$ is a constant dependent upon the shape of the head of the projectile, its length in calibers and its radius of gyration; and n is the number of calibers over which the projectile travels in making one complete turn on its axis at the time of leaving the gun. Their values are ordinarily

$$\begin{aligned} 1-K &= 0.25 \text{ to } 0.20 \\ n &= 20 \text{ to } 30 \\ &(\text{usually } 25) \end{aligned}$$

Taking the mean value of $\frac{dz}{dt}$ between φ and θ , we find

$$\frac{z}{t} = (1-K) \frac{V d^3}{wn} (\varphi - \theta)$$

From this,

$$\frac{z}{x} = (1-K) \frac{d^3}{wn} \frac{(\varphi - \theta) V t}{x}$$

Upon considering that in the act of obeying the deviating force the projectile encounters a lateral air resistance, and if the angular drift be designated D' , and r_z be the retardation in the path of the projectile it is seen that $r_z \sin D'$ is the mean lateral retardation due to this cause. Since D' is small we may substitute its radian measure for its sine and the cross-retardation becomes $D' r_z$. Since the time of flight, t , from φ to θ is the same for both retardations, the distance effects should be proportional to the mean retardations; that is, in the ratio $D' : 1$. The loss of range due to r_z is $V t \cos \varphi - x$ and hence that due to the cross-retardation is

$$D' \left(\frac{V t \cos \varphi}{x} - 1 \right)$$

Hence finally

$$\begin{aligned} D' &= \frac{z}{x} - D' \left(\frac{V t \cos \varphi}{x} - 1 \right) \\ &= \frac{z}{x} \cdot \frac{x}{V t \cos \varphi} \\ &= (1-K) \frac{d^3}{wn} (\varphi - \theta) \sec \varphi \end{aligned}$$

For the point of fall this becomes

$$D' = (1-K) \frac{d^3}{wn} (\varphi + \omega) \sec \varphi$$

If φ and ω are in radians D' is in radians; if they are in degrees D' is given in degrees.

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The correction for height of tide is given by

$$\Delta R = \frac{h}{3} \cot(\omega - \epsilon)$$

ΔR being the range connection in yards and h the height in feet of the tide above the reference mark assumed for the range tables. The same formula is used to compute the danger space which is the space over which a target of height h is in danger of being hit. It is that part of the range beyond the target when the projectile just grazes the top of the target.

The effect of projectiles for guns at the sea coast and on warships is measured partly by their ability to remain entire while passing through armor and the materials of which fortifications are composed, and partly by their capacity to carry explosive. The shell is relatively weak for armor perforation, but has a larger cavity and can carry more explosive, while the shot is better adapted to the work of perforation but has a smaller cavity. The formulas used in coast artillery range tables are, for armor piercing shot:

For Krupp Cemented Armor
Below 1800 feet per second:

$$\frac{t}{d} = 0.3677 \frac{v}{1000} \cdot \frac{v + 400}{1000} \sqrt{\frac{w}{d^3}}$$

Above 1800 feet per second:

$$\frac{t}{d} = \frac{9}{7} \sqrt{\frac{w}{d^3}} \left\{ \frac{v}{1000} - \frac{2}{3} \right\}$$

in which

t = thickness of armor in inches.
 d = caliber of projectile in inches.
 w = weight of projectile in pounds.
 v = striking velocity in feet per second.

These formulas are for normal impact; that is, for a projectile striking armor in a direction perpendicular to its surface. Where the impact is oblique, the path of the projectile being inclined at an angle α to the normal to the plate, the following percentages should be subtracted:

α	Subtract	α	Subtract
0°	0%	25°	6%
5°	0%	30°	8%
10°	1%	35°	11%
15°	2%	40°	15%
20°	4%	45°	19%

For the perforation of deck steel by mortar projectiles,

$$\frac{t}{d} = [5.4175 - 10]v^{2/3} \sqrt{\frac{w}{d^3}}$$

for normal impact, that is for a 90° angle of fall, the deck being horizontal. For any other angle of fall subtract percentages as follows:

Angle of fall	Subtract	Angle of fall	Subtract
45°	20%	70°	4%
50°	16%	75°	2%
55°	12%	80°	0%
60°	9%	85°	0%
65°	6%	90°	0%

For curved and high angle fire the form

$$y = x \tan \varphi - \frac{gx^2}{2V^2 \cos^2 \varphi} \left\{ \frac{1}{1 - Kx} \right\}$$

has given most satisfactory results in practice. As an illustration, it was found practicable to compute zone range tables from 600 feet per second initial velocity to 1500 feet per second initial velocity for the 12-inch mortar, using projectiles weighing from 700 to 1046 pounds and having heads of widely different shapes. It was found that the angle of fall, the striking velocity and the maximum ordinate were in very close accord with calculations by quadratures for the same V , φ , and X , using rigidly accurate methods. The simplicity of the equation above recommends it because of the ready calculation of the elements at any point, x , y , of the trajectory, and because differential formulas for range changes are easily deduced. The value of K is a function of both V and φ , depending to a great extent upon the steadiness in flight of the projectile. Its value must be found from proving ground firings, and formulated in terms of V and φ .

Inspection of the equation at once shows that this trajectory is an hyperbola.

The formulas for range changes are

$$\frac{dX}{X} = (1-M) \frac{dC}{C} + M \frac{d \sin 2\varphi}{\sin 2\varphi} + \left\{ 2 - n(1-M) \frac{dV}{V} + (1-M) \frac{dK}{K} \right\}$$

and as n is here 2.0

$$\frac{dX}{X} = (1-M) \frac{dC}{C} + M \frac{d \sin 2\varphi}{\sin 2\varphi} + 2M \frac{dV}{V} + (1-M) \frac{dK}{K}$$

in which

$$M = \frac{gX}{V^2 \sin 2\varphi}$$

Representing $1 - Kx$ by m , we find upon solving the ballistic problem (see BALLISTICS)

$$x(1-M) = X(1-m)$$

$$1 - \frac{\tan \theta}{\tan \varphi} = \frac{M}{1-M} \cdot \frac{1-m^2}{m^2}$$

$$\frac{v^2 \cos^2 \theta}{V^2 \cos^2 \varphi} = m^2$$

$$\frac{VT \cos \varphi}{x} = \frac{2}{\sqrt{m}(1 + \sqrt{m})}$$

$$y = x \tan \varphi \left(1 - \frac{M}{1-M} \cdot \frac{1-m}{m} \right)$$

For the point of fall

$$\frac{\tan \omega}{\tan \varphi} = \frac{1}{M}$$

$$y = 0$$

$$\frac{v \omega^2 \cos^2 \omega}{V^2 \cos^2 \varphi} = M^2$$

$$\frac{VT \cos \varphi}{X} = \frac{2}{\sqrt{M}(1 + \sqrt{M})}$$

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For the highest point or summit,

$$\theta = 0$$

$$\frac{x_0}{X} = \frac{1}{1 + \sqrt{M}}$$

$$\frac{y_0}{X \tan \varphi} = \frac{1}{(1 + \sqrt{M})^2}$$

$$v_0^2 = M^2 V^2 \cos^2 \varphi$$

$$\frac{t_0}{T} = \frac{\sqrt{M}}{1 + \sqrt{M}}$$

Also

$$y_0 = \frac{1}{2} g T^2$$

Mortars and howitzers, to which the equations just deduced are applicable, are always elevated by means of a quadrant, using φ instead of φ_x .

Mortars and howitzers with their low velocities are generally unable to cover the ground to sufficient range by using a single velocity. The practice is, in general, to make use of several different sized charges of powder to afford several zones or belts of ground, the inner range of one falling somewhat within the outer range of the next inner zone. With high power guns only a single velocity is used.

The penetrative effects of projectiles on various materials are indicated below:

Wrought iron:

$$\left(\frac{t}{d}\right)^2 = \frac{w}{d^3} \cdot \left(\frac{v}{885}\right)^3 \dots \text{Tresidder}$$

Simple steel:

$$t^{0.7} = \frac{w^{0.5}}{d^{0.75}} \cdot \frac{v}{1022} \dots \text{De Marre}$$

Sand:

$$\frac{t}{d} = 81 \frac{w}{d^3} \log \left\{ 1 + 4.6 \left(\frac{v}{1000} \right)^2 \right\} \dots (\text{Parodi})$$

For masonry, brick, concrete, clay, oak, pine, the penetration for sand should, according to Ronca and Bassani, be multiplied, respectively,

by $\frac{1}{3}$, $\frac{5}{9}$, $\frac{1}{3}$ to $\frac{1}{2}$, 2 to 3, $\frac{3}{4}$, $\frac{4}{3}$; for ordinary earth by $\frac{4}{3}$.

For closely approximating to the correct calculation of the elements of a trajectory the following average laws are given:

(A) For high power guns of the Coast Artillery and Navy:

$$F(v) = [7.08693 - 10] v^{1.7}$$

(B) For direct fire Field Artillery guns:

$$F(v) = [2.91280 - 10] v^3$$

(C) For all mortars and howitzers:

$$F(v) = [5.67368 - 10] v^2$$

In the three cases the value of L in the differential formulas becomes

$$(A) \quad L = \frac{6.9M + 1.1}{9.1 - 1.1M}$$

$$(B) \quad L = \frac{3M + 5}{13 - 5M}$$

$$(C) \quad L = \frac{6M + 2}{10 - 2M}$$

In all cases

$$M = \frac{gX}{V^2 \sin 2\varphi}$$

The use of a constant value of n in each of these cases permits the definite formulation of expressions for the remaining elements. Thus

$$y = x \tan \varphi - \frac{gx^2}{2V^2 \cos^2 \varphi} \quad Q_1$$

$$\tan \theta = \tan \varphi - \frac{gx}{V^2 \cos^2 \varphi} \quad Q_2$$

$$t = \frac{x}{V \cos \varphi} \quad Q_3$$

$$v = V \cos \varphi \sec \theta \quad Q_4$$

in which (placing $m = A V^{n-2} \frac{x}{C}$)

$$Q_1 = \frac{1}{n(n-1)m^2} \left[\left\{ 1 + (n-2)m \right\}^{\frac{2n-2}{n-2}} - 1 - 2(n-1)m \right]$$

$$Q_2 = \frac{1}{nm} \left\{ \left\{ 1 + (n-2)m \right\}^{\frac{n}{n-2}} - 1 \right\}$$

$$Q_3 = \frac{1}{(n-1)m} \left\{ \left\{ 1 + (n-2)m \right\}^{\frac{n-1}{n-2}} - 1 \right\}$$

$$Q_4 = \left\{ 1 + (n-2)m \right\}^{\frac{1}{2-n}}$$

For the three cases under consideration these expressions assume the following definite forms:

$$n = 1.7; \log A = 7.08693 - 10$$

$$n = 3.0; \log A = 2.91280 - 10$$

$$n = 2.0; \log A = 5.67368 - 10$$

$$n = 1.7; m = [7.08693 - 10] \frac{x}{C V^{0.3}}$$

$$n = 3.0; m = [2.91280 - 10] \frac{Vx}{C}$$

$$n = 2.0; m = [5.67368 - 10] \frac{x}{C}$$

For $n = 1.7$, for any point x, y

$$Q_1 = \frac{100}{119m^2} \left\{ (1 - 0.3m)^{-\frac{14}{3}} - 1 - 1.4m \right\}$$

$$Q_2 = \frac{10}{17m} \left\{ (1 - 0.3m)^{-\frac{17}{3}} - 1 \right\}$$

$$Q_3 = \frac{10}{7m} \left\{ (1 - 0.3m)^{-\frac{7}{3}} - 1 \right\}$$

$$Q_4 = (1 - 0.3m)^{\frac{10}{3}}$$

For the point of fall, whatever the value of n

$$Q_1 = \frac{V^2 \sin 2\varphi}{gX}$$

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$$\frac{2Q_2}{Q_1} = 1 + \frac{\tan \omega}{\tan \varphi}$$

$$Q_2 = \frac{V T \cos \varphi}{X}$$

$$Q_2 = \frac{v \omega \cos \omega}{V \cos \varphi}$$

For $n=3.0$

$$Q_1 = 1 + \frac{1}{2}m + \frac{1}{6}m^2$$

$$Q_2 = 1 + m + \frac{1}{2}m^2$$

$$Q_3 = 1 + \frac{1}{2}m$$

$$Q_4 = \frac{1}{1+m}$$

For $n=2$, as already shown a hyperbolic trajectory should be used, and the values there given are applicable.

The problems in gunnery which depend on interior ballistics are for the most part those related to changing the charge, weight of projectile, muzzle velocity and maximum pressure. The formulas of interior ballistics do not afford as convenient differential formulas as are desirable, and semi-empirical methods are of considerable value in classifying proving ground results.

Such a method will now be shown:

From the record of firings with gun barrels of different lengths as well as from the formulas of interior ballistics, certain relations between travel and velocity are noted. They take the general form

$$\frac{U}{v} = 1 + \left(\frac{B}{X}\right)^n$$

in which U is the velocity corresponding to infinite travel; v , the velocity corresponding to travel x feet; B the travel for which $v = \frac{U}{2}$

(See BALLISTICS.)

Upon differentiating the above equation, it is found that

$$\frac{v dv}{dx} = \frac{\sigma P}{m} = \frac{n U^2 B^n x^{2n-1}}{(B^n + x^n)^3}$$

and, for a maximum pressure,

$$\frac{dP}{P} = 0 = (2n-1) \frac{dx}{x} - \frac{3n x^n}{B^n + x^n} \cdot \frac{dx}{x}$$

so that

$$\frac{-}{x^n} = \frac{2n-1}{n+1} B^n$$

and accordingly

$$\frac{U}{v} = 1 + \frac{n+1}{2n-1} \left(\frac{x}{B}\right)^n$$

The value $\frac{1}{2}$ for n gives excellent results with our latest powders, and when this value is used the formulas become

$$\frac{U}{v} = 1 + \frac{7}{2} \left(\frac{x}{X}\right)^{3/4}$$

$$\frac{\sigma \bar{P}}{m} = \frac{7}{243} \frac{U^2}{x}$$

For the muzzle velocity, V , $x=X$, and

$$\frac{U}{V} = 1 + \frac{7}{2} \left(\frac{x}{X}\right)^{3/4}$$

$$\frac{12 \sigma \bar{P} X}{m} = \frac{P(C-c')}{m} = \frac{28}{81} U^2 = \frac{X}{x}$$

Hence

$$\begin{aligned} \frac{U^2}{V^2} &= \left\{ 1 + \frac{7}{2} \left(\frac{x}{X}\right)^{3/4} \right\}^2 \\ &= \frac{81}{28} \cdot \frac{\bar{P}(C-c')}{m V^2} \cdot \frac{x}{X} \end{aligned}$$

Place

$$\begin{aligned} L &= \frac{84}{243g} \frac{w V^2}{\bar{P}(C-c')} \\ &= [8.03137 - 10] \frac{w V^2}{\bar{P}(C-c')} \end{aligned}$$

then

$$\frac{x}{X} = L \frac{U^2}{V^2}$$

and finally

$$L = \frac{\frac{x}{X}}{\left\{ 1 + \frac{7}{2} \left(\frac{x}{X}\right)^{3/4} \right\}^2}$$

It is a simple matter to compute a table of values of L for equicrescent values of $\frac{x}{X}$ and

$\frac{U^2}{V^2}$ is readily found also. With such a table it is practicable to reduce to simple form the inverse problem from firings affording data as to V , P , w , C and c' , and also $\bar{\omega}$. The value of L is calculated from the data and $\frac{x}{X}$ and $\frac{U}{V}$ are taken from the table. The computations in using the table may be simplified by placing

$$E = \frac{w V^2}{\bar{P}(C-c')}$$

and tabulating it in place of L , as follows:

$\frac{x}{X}$	E	$\frac{U}{V}$	$\frac{U^2}{V^2}$
.00	.000	1.000	1.000
.01	.754	1.111	1.234
.02	1.323	1.186	1.407
.03	1.780	1.252	1.568
.04	2.158	1.313	1.724
.05	2.478	1.370	1.877
.06	2.751	1.424	2.028
.07	2.988	1.476	2.179
.08	3.194	1.526	2.320
.09	3.375	1.575	2.481
.10	3.533	1.623	2.634
.11	3.675	1.669	2.786
.12	3.802	1.714	2.938
.13	3.914	1.758	3.091
.14	4.015	1.801	3.244
.15	4.105	1.844	3.400
.16	4.187	1.885	3.553
.17	4.261	1.926	3.709
.18	4.326	1.967	3.860
.19	4.387	2.007	4.028
.20	4.441	2.047	4.190

GUNNERY — GUNNY

This table is used as follows:

The data usually appears as below:

Piece in which fired.

Projectile weight, w .

Weight of powder charge, \bar{w} .

Muzzle velocity, V .

Maximum pressure, \bar{P} .

From the name of the piece, the volume of the powder chamber, the total volume of the bore, and the total travel of the projectile are known. These supply all necessary figures.

In addition to the above, the rates of change of velocity and pressure with a change in the weight of the charge are easily determined from the charge-velocity and charge-pressure curves afforded by the firings. These are utilized as follows:

Differentiating the expression

$$\frac{U}{V} = 1 + \frac{1}{2} \left(\frac{\bar{x}}{X} \right)^{3/4}$$

we find

$$\frac{dU}{U} - \frac{dV}{V} = \frac{3}{4} \left(\frac{U}{V} - 1 \right) \left(\frac{d\bar{x}}{\bar{x}} - \frac{dX}{X} \right)$$

That is

$$\frac{dV}{V} = \frac{dU}{U} - \frac{3}{4} \left(\frac{U}{V} - 1 \right) \frac{d\bar{x}}{\bar{x}} + \frac{3}{4} \left(\frac{U}{V} - 1 \right) \frac{dX}{X}$$

and differentiating the expression

$$\bar{P} = \frac{7}{243} \frac{mU^2}{\sigma \bar{x}}$$

we find

$$\frac{d\bar{P}}{\bar{P}} = \frac{dm}{m} + 2 \frac{dU}{U} - \frac{d\sigma}{\sigma} - \frac{d\bar{x}}{\bar{x}}$$

It has been shown under BALLISTICS that

$$\frac{mU^2}{2} = \frac{f\Delta c'}{n-1} = \frac{27.68f\bar{w}}{n-1}$$

So that

$$2 \frac{dU}{U} = \frac{df}{f} - \frac{dm}{m} + \frac{d\bar{w}}{\bar{w}}$$

The mass, m , which is moved by the energy of the charge, is composed of that of the projectile increased by a multiple of the mass of the charge, because of the work done in moving the charge and in disturbing it. Accordingly,

$$m = \frac{w + \beta \bar{w}}{g}$$

and

$$\frac{dm}{m} = \frac{dw}{w + \beta \bar{w}} + \frac{\beta \bar{w}}{w + \beta \bar{w}} \frac{d\bar{w}}{\bar{w}}$$

and for a varying charge

$$\frac{dV}{V} = \frac{1}{2} \frac{d\bar{w}}{\bar{w}} - \frac{1}{2} \frac{\beta \bar{w}}{w + \beta \bar{w}} - \frac{3}{4} \left(\frac{U}{V} - 1 \right) \frac{d\bar{x}}{\bar{x}}$$

$$\frac{d\bar{P}}{\bar{P}} = \frac{d\bar{w}}{\bar{w}} - \frac{d\bar{x}}{\bar{x}} + \frac{\beta \bar{w}}{w + \beta \bar{w}} \frac{d\bar{w}}{\bar{w}}$$

Now \bar{x} is of the form

$$\bar{x} = S \left(\frac{c'}{w} \right)^{2/3} (1 - a\Delta)$$

and consequently

$$\frac{d\bar{x}}{\bar{x}} = \frac{dS}{S} + \frac{2}{3} \frac{dc'}{c'} - \frac{2}{3} \frac{dw}{w} - \frac{a\Delta}{1 - a\Delta} \left(\frac{d\bar{w}}{\bar{w}} - \frac{dc'}{c'} \right)$$

If the charge alone varies

$$\frac{dV}{V} = \left\{ \frac{1}{2} - \frac{1}{2} \frac{\beta \bar{w}}{w + \beta \bar{w}} + \frac{3}{4} \left(\frac{U}{V} - 1 \right) \frac{a\Delta}{1 - a\Delta} \right\} \frac{d\bar{w}}{\bar{w}}$$

$$\frac{d\bar{P}}{\bar{P}} = \left\{ 1 + \frac{a\Delta}{1 - a\Delta} + \frac{\beta \bar{w}}{w + \beta \bar{w}} \right\} \frac{d\bar{w}}{\bar{w}}$$

The values of \bar{P} , C , c' , V , w , X (inches) being known for a given set of firings E is calculated and $\frac{U}{X}$ and $\frac{U}{V}$ are taken from the tables for the mean charge. Knowing from the firing records the values of $\frac{dV}{V}$ and $\frac{d\bar{P}}{\bar{P}}$

for a percentage change $\frac{d\bar{w}}{\bar{w}}$ in the charge, the

equations above permit a and β to be determined, and the values of \bar{x} , c' , w and a afford a value for S which may be called the index of the powder.

Authorities consulted, Brynck, Charbonnier, Cranz, Ingalls, Heydenreich, Challéat, Ronca and Bassani, Parodi, Dunn, Noble and Abel, Vieille, Sarrau, Siacci, Tresidder, De Marre, Ordnance Department, U. S. Army.

ALSTON HAMILTON,

Major, C. A. C., U. S. Army, Fort Monroe, Va.

Gunnison, Royal Arch, judge: b. Binghamton, N. Y., 24 June 1873. He was graduated from the Binghamton Central High School and from the law department of Cornell University. After admission to the New York bar in 1897 he became a United States referee in bankruptcy for Broome, Chenango and Delaware counties, 1898-1904, and United States district judge, first division of the District of Alaska, 1904-9. He has engaged in the private practice of law at Juneau since 1909, and non-resident lecturer on bankruptcy at the Cornell College of Law since 1901. Besides his membership in the New York State Bar Association, he was secretary-treasurer of the National Association of United States Referees on Bankruptcy during the years 1900-05.

Gunnison, a river of Colorado formed at Almont by the junction of the Taylor and East Rivers, flows southwesterly to Gunnison, near Cimarron enters the Grand Cañon of the Gunnison 15 miles long, and continuing in a northwesterly direction past Delta unites with the Grand River at Grand Junction after a course of nearly 200 miles. See UNCOMPHREAGRE VALLEY PROJECT.

Gunny, a jute (see JUTE) cloth, also a bag or sack. Gunny-bags are very largely exported from India to various parts of the world. American cotton is largely packed in these. They can be manufactured at a low price, hence the great demand for them. The name gunny is applied to the cloth as well as to the made-up bags. About 1850 the peasant hand-looms of Lower Bengal met both the home and the foreign demand for Indian-made gunny-bags — indeed the making of these was then the great domestic industry of that portion of India. At the present time the number made at the great steam-factories, of which there are now 23 in India, far exceeds what is produced

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by hand-loom. For example, in one year 82,779,207 gunny-bags were exported from India, of which only 5,000,000 were woven by hand.

Gunpowder, an explosive substance formed by mixing saltpeter, charcoal and sulphur together. The mixture may vary in composition between quite wide limits, and yet possess explosive properties; but the proportions adopted by the United States governmental authorities are saltpeter, 75 per cent; charcoal, 15 per cent; and sulphur, 10 per cent. The saltpeter used is the India saltpeter or niter, which is known to chemists as potassium nitrate, and although found native as an incrustation on the soil in India it is to-day largely made from Chile saltpeter, or sodium nitrate, by reacting on the latter with potassium nitrate. It is carefully purified, finely ground and thoroughly dried for use, in the manufacture of gunpowder. The charcoal most suitable for gunpowder is that variety which is mostly readily ignited, most quickly burned and gives the least quantity of ash. Such charcoal is produced from dogwood, willow or alder, by heating the air-dried woods in closed iron cylinders or retorts out of contact with air so that they undergo destructive distillation and leave the charcoal as a residue, this method of manufacture having been invented in England by Bishop Landloff and adopted in that country in 1797. The dogwood, which is really the alder-buckthorn, *Rhamnus Frangula*, is cut when one inch in diameter; the willow and alder when four inches; though these dimensions vary in practice. The wood is cut in the spring when in full sap, stripped of its bark and seasoned by an exposure of two to three years; the dogwood being stacked under shelter, but the other woods in the open so that the rain may wash the sap from the wood and the sun's rays and the air may destroy the spiral cells. The charring is effected by fires outside the retorts or by passing superheated steam or hot carbon dioxide gas through the retorts. The character and yield of the charcoal produced varies with the temperature to which the wood is exposed and the time of exposure. When the wood is heated to 290° C. red charcoal is formed; when heated to 350° C. or above, black charcoal is produced. When the heating is done quickly the yield of charcoal is much larger than when the heating is slow. Red charcoal is much more easily ignited and burns faster than black charcoal. Charcoal for the manufacture of gunpowder is ground to a fine powder by rotation in a drum with a quantity of brass or bronze balls. Sulphur of commerce is purified for use in this manufacture by fusion and distillation; being eventually obtained in the form of roll brimstone, which is then crushed to a fine powder by heavy rollers. It must be free from sulphuric and sulphurous acids, as well as solid impurities, and should consist entirely of that modification of sulphur which is completely soluble in carbon disulphide.

The dry, finely ground and sifted saltpeter, charcoal and sulphur are weighed into the mixing machine, which consists of a gun-metal drum arranged to make 40 revolutions a minute and provided with hollow bearings through which a shaft is passed which carries 44 arms or fliers of such length as to just clear the interior surface of the drum. This shaft revolves in an opposite direction to and with twice the speed

of the drum. After the ingredients are put in the drum the mixing is carried on for five minutes and then the mixture goes to the incorporating or wheel mill. The process of incorporation is of the greatest importance in this manufacture. It consists in the long continued grinding together of the ingredients in order to mix them so intimately that the product appears to the naked eye as a homogeneous mass, for, unless this be done, complete reaction between the components of the powder by combustion cannot be expected. The finished gunpowder depends for its excellence largely upon the completeness and thoroughness of the incorporation. The incorporating mill consists of a circular bed of iron or stone on which the mixture is placed. A vertical shaft rising through the centre of this bed carries a horizontal one, on the two ends of which heavy stone or iron wheels, called edge runners, are hung. These wheels rotate about the horizontal shaft and, as the vertical shaft revolves, they travel at the same time in a circle around the bed so that, at the points on the bed where the edge runners touch, the motions of rotation and translation are converted into a twisting motion, like that of a muller, and the material beneath is thus overturned and very intimately mixed. The edge runners weigh from three to seven tons, are from four to seven feet in diameter, and are so movable on the spindle that they can accommodate themselves to varying thicknesses of powder on the bed. One of the edge runners is a little nearer the vertical shaft than the other, so that they travel in different paths and they are followed by a scraper which throws toward the centre of the bed the material that has been forced to the exterior by the edge runners. To incorporate, 50 pounds of the mixture are spread out on the mill-bed and slightly moistened and the wheels are set in motion. If the wheels are of stone weighing $3\frac{1}{2}$ tons and making $7\frac{1}{2}$ revolutions per minute, the incorporation is completed in $3\frac{1}{2}$ hours. If the wheels are of iron weighing 4 tons and making 8 revolutions per minute, $2\frac{1}{2}$ hours are required for cannon powder. The operator does not remain constantly in the mill but goes in occasionally to wet the charge, from 2 to 10 pints of water being used in accordance with the weather. The chief danger from accidental explosions during the manufacture of gunpowder is found in the incorporating mills; fortunately there is less explosive material here at any time than there is at any other part of the works. To render the damage done by an explosion as slight as possible, the buildings in which these operations are conducted are built with a strong framework covered with light boards, or else with three sides of stone and the fourth and roof of light wood, so that when an explosion occurs the framework or the stone walls remain. These mills are usually built in groups, and to prevent an explosion in one being communicated to the others, each is provided with a drenching apparatus which automatically wets and protects the charges in the mills adjacent to the one which is blown up. The communication of fire or explosion is also arrested by means of barricades built about the mills which consist of masonry filled with earth, or simple earth mounds or sometimes wooden structures built in the shape of a letter A.

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When the incorporation is completed the mill cake, as the mixture is now called, is removed from the bed and runners by means of a copper chisel and wooden mallet. It is partly in the form of a compact cake and partly fine meal and in this condition it is put into the press. This is a powerful hydraulic press with a rectangular box which is divided into compartments of the desired width by means of copper or gun-metal plates. When the spaces between the plates have been filled with mill cake, pressure is applied which causes the particles to cohere, and the gunpowder is taken from the press in sheets having an area equal to that of the plates and a thickness dependent on the width of the filling space, the amount of the pressure applied and the duration of its application. Sometimes the press plates are corrugated like waffle irons, as for instance, in the manufacture of waffle and of hexagonal powders, and sometimes they are replaced by a press block filled with molds in each of which a separate grain is pressed, as in the manufacture of cocoa or prismatic powder. The operation of pressing is a most important one, since the density of the finished powder depends upon it and, as it is markedly affected by even slight changes in atmospheric conditions, it is a very nice one.

The press cake passes to the corning or granulating machine, where it is cut into grains. This machine consists of a hopper into which the charge is fed, an elevating band, an endless revolving table, four pairs of rollers and several sets of screens for sorting the grains according to size into boxes placed to receive each different size. The rollers, which are of gun-metal, are corrugated or provided with teeth, the upper two being coarser than the lower, and they are adjusted to the size of grain required. When the hopper has been emptied a clutch is relieved which stops the machine and at the same time rings a bell which notifies the operator of the fact for, as the machine is self-feeding, the workmen are not obliged to be present while it is at work. The grains are now freed from dust by passing through horizontal cylindrical sieves such as are used in flour-mills and they are then glazed by rotation in wooden barrels where, by the friction of the grains against each other, their angles are rounded off and a hard polished surface is imparted to them whereby they become better able to bear transportation and are less likely to absorb moisture. Sometimes the grains are coated with graphite which is put in the glazing barrel with them. Though but 4 ounces of graphite are used to 1,200 pounds of gunpowder it is considered objectionable for use with fine grain regulation powder as it delays ignition and fouls the piece, yet it improves powder to be used in fixed ammunition, in that it enables the grains to readily pack close together. As more dust is formed during the glazing process the grains are again put through the dusting reels and are then exposed for a day in the drying house to a temperature of from 125° to 130° F. The finished powder is packed in 1-pound tins or 25-pound kegs, though other sized packages are produced to some extent. According to the size or form or structure of the grains gunpowder is known as *mealed powder*, *superfine*, designated by the mark F.F.G.; *fine grain*, F.G.; *large or coarse grain*, L.G.; *large grain for rifles*, R.L.G.; *mam-*

moth, *pebble*, *pellet*, *cubical*, *hexagonal*, *spher-hexagonal*, *waffle*, *Fassano* or *progressive*, and *cocoa* or *brown prismatic powder*. Mealed powder is in the form of dust and is used for driving fuses for ammunition and in pyrotechny. Fassano or progressive powder is formed by pressing mill cake to a density of 1.79, then breaking this press cake into $\frac{1}{8}$ to $\frac{1}{4}$ inch grains, mixing these grains with a prescribed quantity of fine grain powder, pressing this mixture to a mean density of 1.76 and breaking this press cake into grains about $2\frac{1}{2}$ inches square by $1\frac{3}{4}$ inches thick. By this means a grain of varying density was obtained which burned progressively. This feature was introduced into powder-making by Prof. R. Ogden Doremus of New York, but was developed in Europe. Cocoa or brown prismatic powder is the final stage of development of the compressed perforated grain invented by Gen. Rodman of the United States army. In experimenting with the 15-inch and 20-inch smooth-bore guns invented by him, Gen. Rodman found that he could reduce the initial pressures, while securing the desired velocities, by using perforated disks of compressed powder which were of a diameter equal to the calibre of the gun and between 1 and 2 inches in thickness. He styled this charge a "perforated cake cartridge" and in his 'Properties of Metals for Cannon and Qualities of Cannon Powder,' published in Boston, Mass., in 1861, he mathematically demonstrated that at the beginning such disks presented the minimum of free surface to combustion but as the powder burned there was a constant enlargement of the perforations, whereby the area of surface exposed to combustion was constantly increased and that therefore the volume of evolved gases increased as the volume of the chamber, due to the travel of the projectile, increased, in consequence of which the pressure was more uniformly distributed along the bore than it had been with the granulated powders hitherto employed. Owing to difficulties in manufacture and use, Rodman later found it convenient to build up his charges with perforated hexagonal prisms of comparatively small size. The Civil War prevented the further development of this novel idea in powder-making in this country at that time, but a Russian military commission, which visited the United States during the Civil War, was so impressed by what Rodman had accomplished, that on its recommendation the manufacture was taken up and carried on in Russia on an extensive scale, and it soon spread to other countries. About 1880 Germany adopted cocoa powder, which was a brown prismatic powder with a single canal, the grains having the form of an hexagonal prism, 1 inch in height by 1.36 inches in diameter, and a density of 1.86. This powder, however, differed from ordinary gunpowder both in the kind of charcoal used and in the proportions of the components. The charcoal was underburned or red charcoal made from rye straw, and the composition was saltpeter 80.50 per cent, charcoal 16.00 per cent, sulphur 2.50 per cent, and moisture 1 per cent. Cocoa powder was so successful for use in modern high-powered rifle guns that it was sought for by all military nations and the want was met in this country by substituting for the rye straw charcoal red charcoal from wood and carbohydrates, such as sugar, and this brown prismatic powder



FRANK W. GUNSAULUS, D. D.

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GUNPOWDER PLOT—GUNTER

was used in our modern large calibre guns until displaced by smokeless powder.

Although very great care is exercised in the manufacture of gunpowder, yet there are so many opportunities for variations to occur in each of the many steps of the process that even the best powder-makers cannot regularly produce powder that will always give the same pressure and velocity in the same gun. Since, in order to ensure accuracy of fire, the successive powder charges used must possess the same ballistic properties this result is secured by proving a number of factory runs by firing trials and then mixing these together in the proportions required to produce the desired result. This process is called blending. It was practised by Benvenuto Cellini and has been in vogue ever since.

Good black gunpowder should have a perfectly uniform slate color and it should show no difference in color when crushed. If it is bluish or quite black it contains too much charcoal or is too damp, while the presence of bright points or bluish-white spots indicates that the saltpeter has effloresced. If the powder soils the hand or a sheet of paper when run over them it contains too much moisture or else meal powder. On pressing the powder in the hand it should not crackle or be easily crushed and when crushed the grains should not fall at once to dust, but should first split into angular fragments. Three different densities are determined for gunpowder, each of which furnishes valuable information. These are the gravimetric density which is the weight of a unit volume of powder grains including the air between and enclosed in them; the relative density, which is the weight of a unit volume of powder grains excluding the air between them but including that contained in the pores of the grains; and the absolute specific gravity, which is the weight of the powder exclusive of all air.

Since smokeless gunpowder has been perfected and adopted for use in guns of all calibres it has been declared that it would supersede black gunpowder altogether; yet the census of the United States for 1900 shows that there were over 25,000,000 pounds of black gunpowder made in this country in that year and the production bids fair to be large for many years to come, because in ordnance it is necessary to use a priming charge of black gunpowder with which to fire the smokeless gunpowder; because smokeless powder cannot be efficiently substituted for black gunpowder in the older forms of small arms that are widely scattered over the country; because black powder is most suitable for use in fuses and in pyrotechny; and because smokeless powder is too expensive and inferior for use in saluting.

Gunpowder was formerly used in blasting as well as for a propellant, but usually a special mixture containing as little as 60 per cent of saltpeter was prepared for this purpose. In 1857 Lamotte Dupont of Wilmington, Del., invented *blasting powder* which differs from gunpowder chiefly in that Chile saltpeter is used in place of India saltpeter. Though cruder materials are used and less care is taken the methods pursued for its manufacture are in general similar to those used for gunpowder.

CHARLES E. MUNROE,
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Gunpowder Plot, a famous conspiracy formed in England in 1604 by Robert Catesby, and a small band of other Roman Catholics, who, goaded into excitement by the penal laws directed against their faith and its professors, aimed to blow up the Houses of Parliament by gunpowder 5 Nov. 1605. An anonymous letter of warning, sent to Lord Monteagle, led to the discovery of the plot, and the various conspirators were arrested and executed. Among those put to death was Guy Fawkes, who had been caught in the vault below the House of Lords with matches ready to fire the train. Since 1605 all places are annually searched at the opening of Parliament. Consult Dodd's 'Church History'; Lingard's 'History of England.'

Gunsauls, gŭn-sāl'ŭs, **Frank Wakeley**, American clergyman and educator: b. Chesterville, Ohio, 1 Jan. 1856. He was graduated at the Ohio Wesleyan University in 1875, was ordained to the Methodist ministry, but became a Congregationalist. He was pastor of Congregational Churches at Columbus, Ohio (1879-81), Newtonville, Mass. (1881-5), and Baltimore, Md. (1885-7). In 1887 he became pastor of Plymouth Church, Chicago, and from 1899 of the Central Church of that city. Since 1893 he has been president of the Armour Institute of Technology, Chicago. He has published: 'Monk and Knight' (1891); 'Phidias' (1893); 'Gladstone' (1898); 'The Man of Galilee' (1899); 'Paths to Power' (1905); 'Higher Ministries of Recent English Poetry' (1907); etc.

Gunshot Wounds are wounds caused by missiles projected from firearms by the explosion of gunpowder, etc. Such wounds present great diversity of form, depending on the kind of missile. All show more or less contusion and laceration of the tissue, particularly beneath the surface. Of the two wounds usually caused, that of entrance and that of exit of the missile, the latter is usually the larger. Deflection of the missile from the straight line by hard tissue is common. Thus a ball striking the front of the chest may pass around the ribs, emerging at the back. Infection of the bullet itself, particularly when driven at high speed, is not common; and as the presence of a bullet in the body is not of itself dangerous, the error of much probing along the track is evident. A bullet readily located (the X-rays are now largely used for this purpose) is ordinarily extracted, and where signs of infection become evident the conversion of the punctured wound into a free large open wound is necessary.

Gun'ter, Archibald Clavering, American author: b. Liverpool, England, 25 Oct. 1847; d. New York, 23 Feb. 1907. He was a mining and civil engineer in the West from 1867 until 1875, when he became a stock broker at San Francisco. From 1878 he devoted himself to writing plays and novels. The best known of the former are: 'Courage'; 'Prince Karl'; and 'The Deacon's Daughter.' His works of fiction, sensational volumes, largely without literary merit, include: 'Mr. Barnes of New York' (1887); and 'Mr. Potter of Texas' (1888); both successfully dramatized; 'That Frenchman' (1889); 'Miss Nobody of Nowhere' (1890); 'Baron Montez of Panama and Paris' (1893); and 'Adrienne de Portalis' (1900).

Günther, gūn'tēr, Siegmund, German geographer and mathematician: b. Nuremberg 6 Feb. 1848. Educated at several German universities he became professor of geography in the School of Technology at Munich, in 1886. Among his many valuable professional works may be named 'Lehrbuch der Determinatentheorie' (1875); 'Parabolische Logarithmen und parabolische Trigonometrie' (1882); 'Die Meteorologie ihrem neuesten Standpunkt gemäss dargestellt' (1889); 'Lehrbuch der physikalischen Geographie' (1891).

Gun'ton, George, American economist: b. Cambridgeshire, Eng., 8 Sept. 1845. He came to the United States in 1874, and until 1880 was a writer on economic subjects. He then turned his attention to sociological and economic work, and in 1890 became president of the Institute of Social Economics and editor of the 'Social Economist,' which in 1896 became 'Gun-ton's Magazine.' His publications include 'Wealth and Progress' (1887); 'Principles of Social Economics' (1891); 'Trusts and the Public' (1899).

Guntown, Battle of. After Gen. Forrest's capture of Fort Pillow, 12 April 1864, Gen. Sturgis was ordered to march from Memphis to intercept him, but before the expedition got fairly under way it was ascertained that Forrest had fallen back to northern Mississippi. On 1 June Sturgis started from White's Station, near Memphis, with about 5,500 infantry and artillery, under Col. McMillan, and 3,400 cavalry, under Gen. Grierson, to defeat Forrest and prevent his interference with Sherman's advance on Atlanta. Moving southward, Sturgis reached Ripley, 80 miles from Memphis, on the 8th, and on the 10th struck the Mobile & Ohio Railroad near Guntown, Miss., where Grierson, in advance with the cavalry, met Forrest's cavalry near Brice's Cross-roads, and became immediately engaged. Sturgis, who was six miles in rear with the infantry, moved on the double-quick, followed by a train of 250 wagons and, coming to where Grierson was engaged, without giving his exhausted men a moment's rest, and badly handling them, threw them into the fight. In three hours' time Forrest routed him, drove him from the field in confusion, captured prisoners, guns, and wagons, and closely pursued him to near Ripley. There, early on the morning of the 11th, his rear-guard, taking advantage of a small stream, after a sharp fight checked Forrest, and Sturgis continued his retreat to Memphis, having lost 23 officers and 594 men killed and wounded, 1,623 prisoners, 14 guns, and his entire train of 250 wagons, with 10 days' rations and a large supply of ammunition. Forrest's engaging force did not exceed 4,000 men; his loss was 492 killed and wounded. Consult: 'Official Records,' Vol. XXXIX.

E. A. CARMAN.

Gur'don, Lady Eveline Camilla Wallop, English writer: d. 1894. She was the second daughter of the fifth Earl of Portsmouth, and was married to Sir William Gurdon in 1888. Her contributions to periodicals were collected after her death in a volume entitled 'Suffolk Tales' (1896), in certain respects one of the most noteworthy English collections of short stories, both as regards style and sympathetic treatment.

Gurhwal, gūr-wāl', India. See GARHWAL.

Gurjun (gēr'jūn) Balsam, or Wood Oil, the juice or liquid of the *Dipteracea* which grow in the Andaman Islands. It resembles copaiba balsam, and has at various times been sold as such. Its chief use in the East is as a varnish for boats and for preventing the attacks of ants on timber. It was used for the checking and alleviating of leprosy by the late Father Damien among the lepers of Molokai, in Hawaii.

Gurkhas, goor'káz. See GHURKAS.

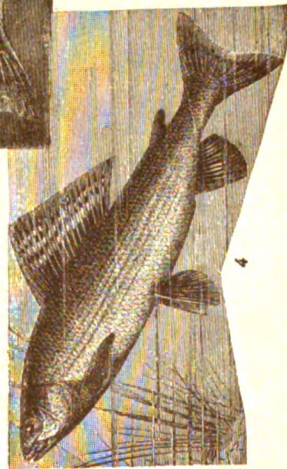
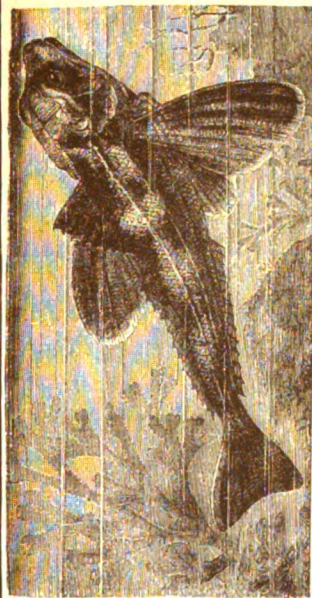
Gurko, goor'kō, Ossip Vladimirovitch, Russian soldier: b. 15 Nov. 1828; d. 28 Jan. 1901. He took part as captain in the Crimean war and as lieutenant-general commanded the Russian advance-corps which at the beginning of the war with Turkey crossed the Danube and seized Tirnova (July 1877). In the same year he captured Gorny Dubnik and Telish, and on 15-17 Jan. 1878 defeated Suleiman Pasha at Philippopolis. He was governor-general of St. Petersburg in 1879-80, of Poland in 1883-94, and in 1894 was retired with field-marshal's rank. He was among the foremost Russian generals of recent times.

Gurnards, gēr'nardz, a family of teleost fishes (*Triglidae*) occurring in all warmer seas, resembling somewhat the sculpins in the rough spiny bones of the skull, but differing in having the body regularly scaled or covered with bony plates. The fantastic sea-robins (*Prionotus*) are common representatives on our coasts. Closely allied are the flying-gurnards (family *Cephalacanthidae*) of the warmer seas, in which the pectoral fins are very long, enabling the fish to flutter a short distance in the air.

Gurney, gēr'nī, Sir Goldsworthy, English inventor: b. Cornwall, England, 1793; d. 1875. He built a steam carriage in 1827, and was the first to devise and use the high-pressure steam-jet in locomotion. He invented the oxyhydrogen blow-pipe, and the Drummond light.

Gurney, Joseph John, English Quaker philanthropist: b. Earlham Hall, near Norwich, England, 2 Aug. 1788; d. there 4 Jan. 1847. He was a banker in Norwich and in 1818 became a preacher in the Society of Friends, and the same year accompanied his sister, Mrs. Elizabeth Fry (q.v.), on her tour to Scotland, having warmly taken up the benevolent cause to which she had devoted herself—the amelioration of the condition of prisoners. In 1827 the two made a journey to Ireland with the same object, and in 1837 Gurney visited the United States and Canada, where he was absent for nearly three years. He went with Mrs. Fry in 1841 to Holland, Belgium, and Germany, and in 1842-4 visited France and Switzerland. The object of these journeys was to reform prison management, and effect the abolition of slavery in the French colonies, for which purpose he had interviews with Louis Philippe and M. Guizot. He was the author of 'Notes on Prisons and Prison Discipline' (1819); 'Observations on the Religious Peculiarities of the Society of Friends' (1824); 'Essays on the Evidences, Doctrines, and Practical Operation of Christianity' (1827); 'Winter in the West Indies Described in Familiar Letters to Henry Clay of Kentucky' (1840).

Gurowski, goo-róf'skē, Adam de, Count, a Polish scholar and author: b. Kalisz 10 Sept.



1. Gurnard (*Trigla hirundo*).

2. Gourami (*Osphiotretus olfax*).

3. Indian Spring Eel (*Mastacembelus armatus*), above; and Golomyzka or Oilfish of Lake Baikal (*Comephorus baicalensis*), below.

4. Grayling (*Thymallus thymallus*).

5. European Goby (*Gobius fluviatilis*).

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GURTEEN — GUSTAVUS

1805; d. Washington, D. C., 4 May 1866. In early life he was a leading Polish patriot, and an instigator of the revolution of 1830. Later he became an advocate of Pan Slavism, and was employed in Russia. In 1841 he left the latter country and in 1849 came to the United States, and from 1861 to 1863 was a translator in the State Department at Washington. Among his works, several of which were written in French and German, are: 'Civilization and Russia' (1840); 'Pan Slavism' (1848); 'Russia as It Is' (1854); 'The Turkish Question' (1854); 'America and Europe' (1857); 'My Diary: Notes on the Civil War' (1862-6).

Gur'teen, Stephen Henry Villiers, American Protestant Episcopal clergyman and sociologist: b. near Canterbury, England, 9 June 1840; d. 1898. He was educated at Jesus College, Cambridge, and was ordained in 1875. He was professor of Latin at Hobart College, Geneva, N. Y., was successively rector of Trinity Church, Buffalo, and Trinity Church, Toledo, Ohio, and dean of St. Paul's Cathedral in Springfield, Ill. He interested himself in charity organization, and was instrumental in forming the Order of Associated Charities. He wrote: 'Phases of Charity' (1877); 'Provident Schemes' (1879); 'What is Charity Organization?' (1879); 'Handbook of Charity Organization' (1882); 'How Paupers are Made' (1883); 'Beginnings of Charity Organization in the United States' (1894).

Güssfeldt, Paul, powł gūs'fēlt, German explorer: b. Berlin 14 Oct. 1840. He studied science and mathematics between 1859 and 1865 in Heidelberg, Giessen, and Bonn. The German African Company sent him out on an expedition in 1872 to explore the Loango coast. He was shipwrecked near Freetown (14 Jan. 1873), and landed at the mouth of the Kongo. He has given an account of this expedition in the work 'The Loango Expedition' (1879), which he wrote in collaboration with his fellow travelers Falkenstein and Pechuel-Loesche. In 1876 he explored the Arabian Desert, and in September 1882 he visited South America. Among the Andes he discovered a vast area of glaciers, in lon. 34° 30' S. He climbed the highest peak of the volcanic range of the Andes (21 Feb. 1882) and reached the edge of the crater of Maipó, and during April and May of the same year explored the lofty plateaus of Bolivia. He has published 'In den Hochalpen' (1893); 'Reise in den Anden von Chile und Argentinien' (1887); 'Der Mont Blanc' (1894).

Gustavus (gūs-tā'vūs) I. (commonly called **GUSTAVUS VASA**), king of Sweden: b. Lindholmen 12 May 1496; d. Stockholm 29 Sept. 1560. He studied at the University of Upsala, and entered the service of Sten Sture the younger, administrator of the kingdom, in 1514. Sweden had, by the union of Calmar, become subject with Norway to the crown of Denmark. The country was at this time divided into two parties. There was a Danish party headed by the Archbishop of Upsala, and a Swedish party, which upheld the independence of the country, headed by the administrator whom it had raised to power. Gustavus fought with distinction under Sture against the Danes in 1517 and 1518. He was one of six hostages sent by Sture as guarantee of the safety of King Christian II.,

but effected his escape, and reached Lübeck in 1519. After wandering about for some time as a proscribed fugitive he took refuge in the mines of Dalecarlia, where he worked as a common laborer. After various adventures he attempted open resistance. Christian II. was crowned at Stockholm on 4 Nov. 1520. On the 8th the leaders of the Swedish party, among whom was Gustavus' father, were executed. By the beginning of 1521 Gustavus had raised a considerable force, driven the Danes from several positions, and excited a general insurrection in Dalecarlia. In April he defeated the Danes at Westeraas; in July he seized Upsala, and in August was named administrator of the kingdom by the states which had assembled at Wadstena. On 6 June 1523 he was elected king by the Diet of Strengnäs. In 1527 he obtained the exclusion of the bishops from the senate, and their subjection to the civil power. He now openly professed Lutheranism, and was crowned by a Protestant archbishop of Upsala on 12 Jan. 1528. The Lutheran religion was formally established at a diet held at Orebro in 1529. In 1544 the states assembled at Westeraas declared the kingdom hereditary in his house. A war broke out with Russia in 1555, which was concluded by the Peace of Moscow, 2 April 1557.

Gustavus II. (**GUSTAVUS ADOLPHUS**), king of Sweden, grandson of Gustavus Vasa: b. Stockholm 9 Dec. 1594; d. Lützen, Saxony, 16 Nov. 1632. He was trained to war under experienced generals, and at 16 took his place in the state council; Charles IX., the father of Gustavus, had been declared king to the exclusion of his nephew Sigismund, who, on accepting the crown of Poland during his father's lifetime, had abjured the Protestant religion. On the death of Charles, Gustavus succeeded him, with the consent of the states, as king-elect. Sweden was at this time at war with Denmark, and Gustavus was in command of the army. He chose for his chancellor and first councillor Axel Oxenstiern, a man 10 years his senior, and already eminent for his ability, who eventually proved himself to be one of the greatest of European statesmen. The war with Denmark was concluded through the mediation of England in 1613. A new enterprise at this time presented itself to the ambition of Gustavus—the throne of Russia was vacant and contested. A party favored the election of Charles Philip, the brother of Gustavus, and was supported by a Swedish invasion under Gen. de la Gardie, who had penetrated to Novgorod; while the Poles, who had also invaded Russia, had reached Moscow. Michael Romanoff was, however, elected czar. Gustavus took a personal share in the Russian war, which continued for about four years after this election, and had made considerable conquests in Livonia and the neighboring provinces when peace was concluded at Stolbova in 1617. In 1620 he married Eleanor, sister of the elector of Brandenburg. The war with Russia was followed by war with Poland, which lasted nine years, and was concluded on advantageous terms for Gustavus by a six years' truce in September 1629. He had made important conquests, which he was allowed to retain, in East Prussia.

His attention was now diverted from northern wars by the affairs of Germany. The oppression of the Protestants by Ferdinand II.

GUSTAVUS—GUTENBERG

excited his sympathy. He was alarmed by the progress of Wallenstein, which threatened to extend the empire to the Baltic, and by leaguering himself with the Protestants of Germany he might hope for easier and more extensive conquests than by struggling single-handed against the northern powers. He named his daughter Christina heiress to the throne, embarked for Germany in May 1630, and landed with an army of 13,000 men in the island of Usedom on the coast of Pomerania. (See **THIRTY YEARS' WAR**.) After repeatedly defeating the imperial generals, and conquering a great part of Germany, he was killed in the battle of Lützen. Gustavus differed from some other great commanders in preferring a small well-ordered army to a large one, asserting that all over 40,000 men were an encumbrance. His character made him beloved by his soldiers, and he was served with a devotion which enabled him to effect great things with small means. The discipline he imparted to the Swedish army, and the prestige of success derived from his victories, lasted long after his death. His body was taken to Sweden. See Droysen, 'Gustav Adolf' (1879); Stevens, 'History of Gustavus Adolphus' (1885); Fletcher, 'Gustavus Adolphus' (1891); Dodge, 'Gustavus Adolphus' (1896).

Gustavus III., king of Sweden: b. Stockholm 24 Jan. 1746; d. there 29 March 1792. He was the eldest son of Adolphus Frederick, duke of Holstein, who had been called to the Swedish crown in 1743, and succeeded his father on 12 Feb. 1771. He found the country divided between two aristocratic factions, the adherents of France and Russia, known respectively as the Hats and Caps. He resolved to give the country a new constitution, and to increase the power of the crown. He instituted a new military order of Vasa, in order to gain the goodwill of the officers; and effected his purpose by means of a sham revolt, which enabled him to assemble troops, wherewith he surrounded the assembly of the states-general, and forced them to accept his constitution, which, as it only circumscribed the privileges of the nobility, was generally popular. In 1788, when war had broken out with Russia, the nobles revenged themselves by inducing the states-general to refuse himself supplies. The fidelity of the Dalecarlians enabled him to repulse the enemy. To free himself from the hostility of the nobles he determined on another *coup d'état*, which he executed on 3 April 1789, by causing the leaders of the opposition to be arrested, and then passing a law extending the royal prerogative. He concluded peace with Russia by the Treaty of Væla in August 1790. The Swedes were opposed to an alliance with Russia, and a diet which Gustavus assembled at Gefle for the purpose of procuring supplies, though surrounded with troops, proved so refractory that he was obliged to dismiss it. The nobles long before this had formed a conspiracy against him, and resolved on his death. Three of them took an oath to murder him, and drew lots which should carry out their intention. The lot fell on Captain Ankarström, who shot the king in the back at a masquerade given at the opera house at Stockholm, 16 March 1792. See Bain, 'Gustavus III. and his Contemporaries' (1895).

Gustavus IV., Adolphus, king of Sweden: b. 1 Nov. 1778; d. Saint Gall, Switzerland, 7

Feb. 1837. He succeeded on the death of his father, Gustavus III., and, on assuming power, showed that he had inherited his father's hatred of the principles of the French revolution, which he carried to the extent of fanaticism. In 1803 he made a journey to Germany to promote a union of the German princes against Napoleon. He was at Karlsruhe when the Duke D'Enghien was seized, and sent his aide-de-camp to Paris to protest against that act of violence. After the Peace of Tilsit he exposed himself to a war with Russia while he was at war with France, by refusing to join the continental blockade and opening his ports to England; and in 1808 he quarreled with England, his only ally. His internal policy was as bad as his external. His subjects were oppressed with taxes to support his wars, and had in return the humiliation of finding Pomerania in the possession of France, and Finland in that of Russia. A conspiracy was formed against him; he was deposed, and the diet by a decree of 10 May 1809 declared his family forever incapable of succeeding to the crown of Sweden. His uncle, the duke of Sudermania, was proclaimed king, under the title of Charles XIII., and in the following year adopted as his successor, Bernadotte, prince of Pontecorvo. Gustavus died in poverty. He took the title of Colonel Gustafson, and has left, among other writings, 'Memoirs of Colonel Gustafson' (1823). See Kleinschmidt, 'Die Irrfahrten Gustavus IV. Adolf von Schweden' (1888).

Gutenberg, goo'tén-bérg, Johannes or Henne, German inventor of printing with movable types: b. Mainz about 1400; d. there 23 Feb. 1468. Little or nothing is known of his early life. In 1434 he was living in Strasburg, and in 1436 entered into a contract with one Andreas Dryzein or Dritzehn and others, binding himself to teach them all his secret and wonderful arts, and to employ them for their common advantage. The death of Dryzein, which happened about the end of 1438, broke off the undertaking of the company. About 1448 he returned to Mainz, and soon formed a copartnership with Johann Fust or Faust, a rich goldsmith who furnished money to establish a press, in which the Latin Bible was first printed. This, the Mazarin Bible, begun about 1450 and finished about 1455, is the first book known to have been printed with movable types. After some years this connection was dissolved. Fust had made large advances, which Gutenberg was now called upon to repay; and as he either could not or would not do it, the subject was carried before the tribunals. The result was that Fust retained the press, which he improved, and continued to use in company with Peter Schöffer of Gernsheim. By the patronage of a counsellor of Mainz, Conrad Hummer, Gutenberg was again enabled to establish a press the following year, from which there issued the fine 'Catholicon' of 1460, and also the 'Letters of Indulgence' of 1454 and 1455. Gutenberg's name does not appear in any production of his press, nor do any of his friends and patrons mention him in connection with the invention of printing. See Van der Linde, 'Gutenberg' (1878), and 'Geschichte der Erfindung der Buchdruckerkunst' (1886); Hessel, 'Gutenberg: Was He the Inventor of Printing?' (1882); 'Haarlem the Birthplace of

GUTHRIE—GUTTA PERCHA

Printing, not Mentz' (1887); Gordon Duff, 'Early Printed Books' (1893).

Guthrie, Thomas, Scottish clergyman and philanthropist: b. Brechin, Forfarshire, 12 July 1803; d. Saint Leonard's, Sussex, 24 Feb. 1873. He was educated at the University of Edinburgh, and was licensed as a preacher in connection with the Church of Scotland in 1825. He accepted a call to Greyfriars, Edinburgh, in 1837, where he soon became very popular with all classes. In 1843 the Disruption took place, and Guthrie was active with Chalmers and Candlish in organizing the Free Church, becoming minister of Free St. John's, Edinburgh. The work with which his name is chiefly identified out of Scotland, was the establishment of ragged schools, of which he was the earliest advocate. He was widely known for his gifts as an orator, and on retiring from the ministry in 1864 was editor of 'The Sunday Magazine' till his death. Among his published works are: 'The Gospel in Ezekiel' (1855); 'A Plea for Ragged Schools' (1847); 'The City: its Sins and Sorrows' (1857); 'Autobiography' (1874-5). See Smeaton 'Thomas Guthrie' (1900).

Guthrie, Thomas Anstey ("F. ANSTREY"), English humorist: b. Kensington, London, 8 Aug. 1856. He was graduated from Cambridge in 1875, and called to the bar in 1880, but never practised and has devoted himself to authorship, his books having been extremely popular both at home and in the United States. He is the author of 'Vice Versa' (1882); 'The Giant's Robe' (1883); 'The Black Poodle' (1884); 'The Tinted Venus' (1885); 'A Fallen Idol' (1886); 'The Pariah' (1889); 'Tourmalin's Time Cheques' (1890); 'Voces Populi' (1890); 'Mr. Punch's Pocket Ibsen' (1893); 'Puppets at Large' (1897); 'Love Among the Lions' (1898); 'The Brass Bottle' (1900); 'A Bayard From Bengal' (1902); etc.

Guthrie, William Norman, American Episcopal clergyman and author: b. Dundee, Scotland, 4 March 1868. He was graduated from the University of the South in 1889 and was professor of modern languages there 1889-90, and at Kenyon College, Ohio, 1892-3. He entered the Episcopal ministry in 1893, and has since been rector of several Cincinnati churches. He has published: 'Love Conquereth' (1890); 'Modern Poet Prophets: Essays Critical and Interpretative' (1897); 'Songs of American Destiny' (1900).

Guthrie, Okla., once capital of the Territory of Oklahoma and the county-seat of Logan County, on the Cottonwood River and on the Atchison, Topeka & Santa Fe, the Chicago, Rock Island & Pacific, the Oklahoma Eastern, the Missouri, Kansas and Texas, the Fort Smith & Western, Denver, Enid & Gulf, and the St. Louis, El Reno & Southern Rys.

Industries, Etc.—Guthrie has a very large trade, and is especially noted as a wholesale distributing centre. It has planing, flour and cotton-seed oil mills, furniture and carriage factories, a foundry and machine shops; a broom works, a plow factory, creamery, railroad repair shops, novelty works, book bindery, etc.

Buildings, Educational Institutions, Etc.—Guthrie's chief buildings are the capital, Federal court and post-office building, the city hall, the Scottish Rite temple, Carnegie Library, and the

Federal prison. The Carnegie Library (costing \$25,000) is a noteworthy institution. The city possesses an excellent public school system, including a high school, Saint Joseph's Academy, and many private schools add to the city's educational facilities. A \$50,000 county high school has just been built, and the Capitol University is located on a height overlooking the city on the west.

Government.—The city is governed by a mayor and a council of ten members elected biennially. The chief of police and all other city officers are chosen by the people. The city has electric lighting and owns and operates its own water-works, has several miles of paved streets, large gas plant and work has begun on a street railway.

History.—Guthrie dates its existence from the opening of the territory in 1889, and it was made the capital city one year later, in 1890. The city has had a rapid development. Its rival, Oklahoma City, about 30 miles south, is the State capital. Pop. (1900) 10,006; (1910) 11,654.

Gut'ta Per'cha, a substance which has been known generally and used in Western countries only since about 1845, though travelers and residents in the East were acquainted with it long before, and had seen various articles made of it, but without knowing the nature of the material. It is the inspissated milky juice of several large trees belonging to the order *Sapotaceæ*, the principal being *Isonandra gutta*, and is obtained by felling the large and old trees, cutting off rings of bark at intervals along the stem, collecting the juice which issues, and concentrating by evaporation, if necessary. The result of this terribly wasteful process is, that the gutta percha tree has been exterminated from various districts in which it was formerly abundant. The tree is found in the Malayan peninsula, and in some of the neighboring islands, in great numbers and of very large size; but if these trees be also cut down, instead of the juice being tapped by incisions (a method which has now come into use), gutta percha will become one of the rarest of substances.

The crude substance is gray or reddish, and is mixed with fragments of bark, leaves, and other impurities, from which it is separated by washing with cold and then with warm water. This softens the gutta percha, and the impurities can be easily picked out. When pure it has a brown color; at the ordinary temperature it is hard and tough, and in not too thick pieces is flexible like leather. It is elastic only to a very slight extent, and cannot be beaten out. It has little or no adhesion for other bodies, but its own cohesiveness is remarkable; a thin strip of it bearing a very considerable weight. When warmed it gradually softens, and then can be drawn into fine fibres, rolled into sheets, or molded. For the latter purpose it is admirably adapted, as when warm and soft it takes the finest impressions, which it retains after it has become cold and hard. When heated to a sufficiently high temperature in the air it catches fire, and burns with a bright flame; heated in close vessels it gives off oily hydrocarbons and an acid liquor, so that gutta percha seems to consist mainly of carbon and hydrogen, with some oxygen, while nitrogen is absent, or present only in very minute quantities. Attempts have been made to resolve gutta percha into

proximate constituents, and accordingly three substances extracted from it have been described. These are named respectively gutta, which is the chief constituent, and when pure is white and opaque; alban, a white oxygenated crystalline substance; and fluavil, also oxygenated, and of a yellow color. These two are said to be formed from the first by oxidation, but there is a considerable diversity of opinion on the nature of these bodies. Ordinary gutta percha is insoluble in water, partially in alcohol and ether, readily and completely in chloroform, turpentine, benzol, bisulphide of carbon, and naphtha. It is also dissolved to a slight extent by oils. It is not attacked by solutions of alkalis, nor by hydrofluoric acid; but it is acted on by sulphuric, nitric, and hydrochloric acids—being darkened in color, oxidized, rendered brittle, or altogether disintegrated—and by chlorine, which transforms it into a white substance like ivory. It is also affected by the oxygen of the air, especially in light, becoming brittle, resinous, and acid; it combines with sulphur and, like caoutchouc, can be vulcanized. Gutta percha is employed for a great variety of purposes, especially for insulating electric wires, being invaluable for submarine telegraph cables because, as a natural insulator of electricity, it is not affected by water, is very pliant, and forms a uniform and close-fitting coating to the wires. It is much prized for making certain kinds of surgical instruments, and in sheets for surgical dressing, and is used for making water-pipes and tubes of various kinds, hose, machine-beltting, soles for shoes, golf-balls, overshoes, buckets, picture-frames, and many other articles in general use.

Guy, Thomas, English philanthropist: founder of Guy's Hospital, London: b. about 1645; d. December 1724. His principal income arose from the disreputable purchase of seamen's prize tickets in Queen Anne's war, and from his dealings in South Sea stock in 1720. By these speculations, aided by most penurious habits, he amassed a fortune of nearly half a million pounds sterling, of which he spent upward of \$1,000,000 in building and endowing his hospital in Southwark. He also erected almshouses at Tamworth, furnished three wards of St. Thomas' Hospital, and benefited Christ's Hospital and various other charities. He was member of Parliament for Tamworth 1694–1707.

Guy Mannering, a novel by Sir Walter Scott. It was the second of his novels, appearing anonymously in 1815, seven months after 'Waverley.' It is said to have been the result of six weeks' work, and by some critics is thought to show the marks of haste. Its time is the middle of the 18th century, its scene chiefly Scotland. There are fewer than two-score characters in 'Guy Mannering,' and the plot is not very complicated. Meg Merrilies, and Dominie Sampson, the uncouth, honest pedant, are the only great creations it contains.

Guy of Warwick, a metrical romance belonging to that Anglo-Danish cycle from which the Norman trouvères drew so much material. The earliest existing manuscripts of this romance are in French; though it is supposed to have been written by Walter of Exeter, a Cornish Franciscan. It consists of about 12,000

verses, iambic measure, arranged in rhymed couplets.

Guyon, Jeanne-Marie Bouvier de la Motte, zhān mā-rē boo-vē-ā dē lā mōt gē-ōn, MADAME, French mystic: the introducer in France of the system of Quietism, b. Montargis 13 April 1648; d. Blois 9 June 1717. At the age of 16 she was married to Jacques Guyon, after whose death in 1676 the tendency to mystic enthusiasm which had characterized her younger years again acquired ascendancy. She published numerous works, such as 'Le Cantique des Cantiques interprété selon le Sens Mystique' (1685); 'Poésies Spirituelles' (1685); 'Discours Chrétien et Spirituels' (1716); etc. At last the archbishop of Paris thought it necessary to take steps against the spread of Madame Guyon's mystical doctrines, and through his influence she was shut up in the convent of the Visitation, but afterward released at the instigation of Madame Maintenon, who herself became for a time a convert to the new doctrines, and allowed Madame Guyon to preach in the seminary of St. Cyr, where she made a convert and disciple of Fénelon. A commission of ecclesiastics, chief among whom was Bossuet, now sat in judgment, and the doctrines of Madame Guyon were condemned (1695). This led to her being imprisoned for some years, latterly in the Bastille, whence she was liberated in 1702. The rest of her life was spent in retirement and in works of charity. See Upham, 'Life, Religious Opinions, and Experiences of Madame Guyon' (1870); Guerrier, 'Madame Guyon, sa vie, sa doctrine, son influence' (1881).

Guyot, gē-ō, Arnold, American geographer: b. near Neuchâtel, Switzerland, 28 Sept. 1807; d. Princeton, N. J., 8 Feb. 1884. He studied theology at Neuchâtel and Berlin; but later turned his attention to natural science, and in 1835 took the degree of doctor in the University of Berlin. He then went to Paris, where he resided five years, passing the summers in scientific excursions through France, Belgium, Holland, and Italy, examining the characteristic physical features of those countries. In a tour of Switzerland, in 1838, he ascertained and announced in a communication to the Geological Society of France several of the most important laws concerning glaciers. He first discovered the laminated structure of the ice, and showed that the motion of the glacier is due to the displacement of its molecules. These discoveries were fully confirmed and illustrated by the investigations of Agassiz, Forbes, and others. He next investigated the distribution of erratic boulders, in order to solve the question of the mode of their transportation. During seven summers he traced them on both sides of the central Alps, in Switzerland and Italy. Their vertical limits and the laws of their descent were determined by means of more than 3,000 barometrical observations; and the characteristic species of rock of each basin were tracked step by step to their source, often in the midst of the highest regions of ice and snow. A collection of more than 6,000 specimens of rocks was made as vouchers for the results. The full details of these investigations were announced to form the second volume of the 'Système glaciaire' by Agassiz, Guyot, and Desor, the first volume of which was printed in

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Paris in 1848; but the political disturbances of that epoch and the removal of Guyot to the United States prevented its publication. The main results, however, are to be found in the 'Bulletin de la Société des Sciences Naturelles de Neuchâtel,' and in D'Archiac's 'Histoire de la Géologie'; and have since passed into various scientific manuals. In the College of Neuchâtel, which numbered Agassiz among its professors, Guyot occupied, from 1839 to 1848, the chair of history and physical geography. In the latter year a political revolution in Neuchâtel broke up the institution, and he was induced by Agassiz to remove to the United States. He resided for several years at Cambridge, Mass., occupying himself with the study of the physical geography of the American continent, and first became extensively known in this country by a course of lectures delivered in Boston in the winter of 1848-9 in the French language, on the relations between physical geography and history. These were translated and afterward collected into a volume entitled 'Earth and Man' (1849). The work had a large circulation in the United States, where it was extensively used as a text-book. For several years Guyot was employed by the Massachusetts board of education to deliver lectures in the normal schools of the State and before teachers' institutes, and in this way, addressing annually 1,200 or 1,500 teachers, he exercised an important influence in reforming the method of teaching geography. From 1855 until his death he was professor of geology and physical geography at Princeton. His meteorological observations, undertaken for the government, were the basis of the present United States weather bureau. Among his further works are 'Treatise on Physical Geography' (1873); 'A Memoir of Agassiz' (1883); and 'Creation, or the Bible Cosmogony in the Light of Modern Science' (1884).

Guyot, Yves, év. French publicist: b. Dinan, France, 6 Sept. 1848. He began his studies at Rennes, and early interested himself in social and economic problems of international importance. He took part in the revolution of 4 Sept. 1870, which, after the surrender of Sedan, established the third Republic. He is an ardent reformer, but not a socialist, a free-trader and member of the Cobden Club. In 1885 he was elected to the French Parliament, and in 1889 made minister of public works. He has for years been editor of the *Siècle*, a Liberal paper of a staid, old-fashioned style. He took a prominent part in the defense of Dreyfus, and waged a successful war for the abolition of the continental sugar bounties. Among his writings may be noted 'La Tyrannie Socialiste' (1893); 'Les Principes de '89 et le Socialisme' (1894); 'L'Economie de l'Effort' (1896); 'Le Bilan de l'Eglise' (1901); and 'La Question des Sucres' (1901).

Guzerat, güz-ě-rāt'. See GUJARAT.

Guzman Blanco, Antonio. See BLANCO, ANTONIO GUZMAN.

Gwin'nett, Button, American patriot, one of the signers of the Declaration of Independence: b. England about 1732; d. Georgia 27 May 1777. He emigrated from Bristol to America in 1770, purchased a tract of land on St. Catharine's island, Georgia, and devoted him-

self to agriculture. He became conspicuous in 1775 by his maintenance of the colonial rights, was elected a representative to Congress in Feb. 1776, and re-elected for the following year, and in 1777 became president of the provincial council, the highest station in Georgia. He planned a military expedition against East Florida, which he refused to entrust to his rival Gen. McIntosh, whose official rank entitled him to command it, and which resulted disastrously. This event, aggravated by other disturbances, led to a duel between him and McIntosh, in which he was mortally wounded. See Dwight, 'Lives of the Signers' (1895).

Gwynn, Eleanor, commonly **Nell Gwynn**, English actress: b. Hereford, England, 1650; d. London 1687. She was at first an orange girl, and also gained her bread by singing from tavern to tavern. She became the mistress of Hart and Lacy, the actors, before going in her 16th year upon the stage, where she distinguished herself in light comedy. About 1667 she became the mistress of Lord Buckhurst, who surrendered her to the king. She caused much embarrassment to the Duchess of Portsmouth, who deemed herself too refined for such a rival. It is said that in her elevation she showed her gratitude to Dryden, who had patronized her in her poverty; and, unlike the other mistresses, was faithful to her royal lover. From her are sprung the dukes of St. Albans.

Gymkhana, jīm-kā'na, a term of Hindu origin, presumably derived from *gend-khana*, that is, ball-house, and associated by Anglo-Indian soldiers and civilians with 'gym' or gymnasium, whence its introduction into the English language. It is applied to a building or grounds arranged for athletic recreation, and signifies also the open air meetings for athletic and other mixed sporting events, including horse racing, which are the annual features of almost every military cantonment throughout India.

Gymnastics, History of. The development of gymnastics began in an early period of Grecian and Roman history. Systematic exercise received the stamp of approbation from the most eminent educators of ancient times, and has the endorsement of all teachers to-day. Such exercise has had its periods of decline in popularity, due to the development of professionalism, stimulated by the conferring of extravagant honors and rewards which caused the ranks of the athletes to be filled by a professional class of low extraction, who made their art a trade. But through these periods of decline there have been those who have kept in mind the true value and aim of regularly and systematically conducted exercise; and these advocates have outlived and lived down these evils. So that we find that the scientifically conducted gymnastics have never entirely lost their hold upon educators and those interested in the betterment of mankind.

Modern gymnastics differ considerably from the exercises of the ancients, which at first consisted of athletic feats performed by each individual according to his own notion, and were encouraged among the youth as combining amusement with exercise. They were at length reduced to a system which, in Greece, formed a prominent feature in the state regulations for

GYMNASTICS

education. In fact the period for gymnastics was equal to the time spent on art and music combined. Public games were consecrated to the gods, and were conducted with the greatest ceremony. The earliest mention we can find of gymnastic sports is in Homer's 'Iliad,' Book II., and again in Book XXIII., when Achilles instituted games in honor of Patroclus, and distributed prizes to the victors for boxing and wrestling. Plato tells us that just before the time of Hippocrates gymnastics were made a part of medical study, because they were suited to counteract the effects of indolence and luxurious feeding, and that at length they became a state matter reduced to a system and superintended by state officers. The first public gymnasia were built by the Lacedæmonians. These were imitated at Athens, where, in one called the Academy, Plato instructed his pupils, and in another, the Lyceum, Aristotle taught. These buildings were superintended by a chief officer. The athletics were in charge of a director, and medical officers were in attendance to prescribe the kind and extent of exercise. Baths were attached to the gymnasia, and a hot bath, followed by a cold plunge, was recommended. Plato and Aristotle considered that no republic could be deemed perfect in which gymnasia, as part of the national establishment, were neglected.

The Spartans were the most rigid in exacting for their youth a gymnastic training; even the girls were expected to be good gymnasts. The exercises for pupils in the gymnasia consisted of a sort of tumbling, war-dances, running—for both sexes—leaping, climbing ropes; of jumping or springing from the knees, with weights attached to the body, maintaining the equilibrium while jumping on slippery skins filled with wine; and of wrestling for the throw. Riding, driving, swimming, rowing, and swinging supplemented the indoor work.

During the Middle Ages the knightly amusement of the tournament absorbed nearly every other sport except foot-racing and wrestling, so that gymnastics fell into disuse till Basedow (q.v.) in 1776, at his institution in Dessau, united bodily exercises with other instruction. This example was followed by Salzmann at his institute and, from this small commencement, the practice gradually extended. In the latter part of the 17th century gymnastics were extensively introduced into Prussian schools by Guts Muths, who wrote several works on the subject. In 1810 the system was still more widely spread by Jahn, who is regarded as the founder of the present Turnverein (q.v.). Prussia at that time was impatient under Napoleonic rule, and Jahn conceived the idea of bringing together the young men for the practice of gymnastic exercises, and, at the same time, indoctrinating them with patriotic sentiments which might be made available to expel the French from Germany. The Prussian government favored the plan, and, in 1811, a public gymnastic school, or Turnplatz, was opened at Berlin, and was quickly imitated all over the country. In 1813 the citizens were called to arms against the French, and Jahn himself commanded a battalion of Lützow's volunteers. When, however, there was no longer any reason to dread the French, the government of Prussia, regarding the meeting of patriotic young men as a means of spreading liberal ideas, closed

the gymnastic schools and Jahn was imprisoned. In other countries, however, the system introduced by Jahn was eminently successful, especially in England, Switzerland, Portugal, and Denmark. It was first introduced into female education under the name of calisthenics when systematic exercises were added to hoop-trundling, skipping-ropes, etc., and to riding, archery, and other healthy outdoor exercises practised among the women.

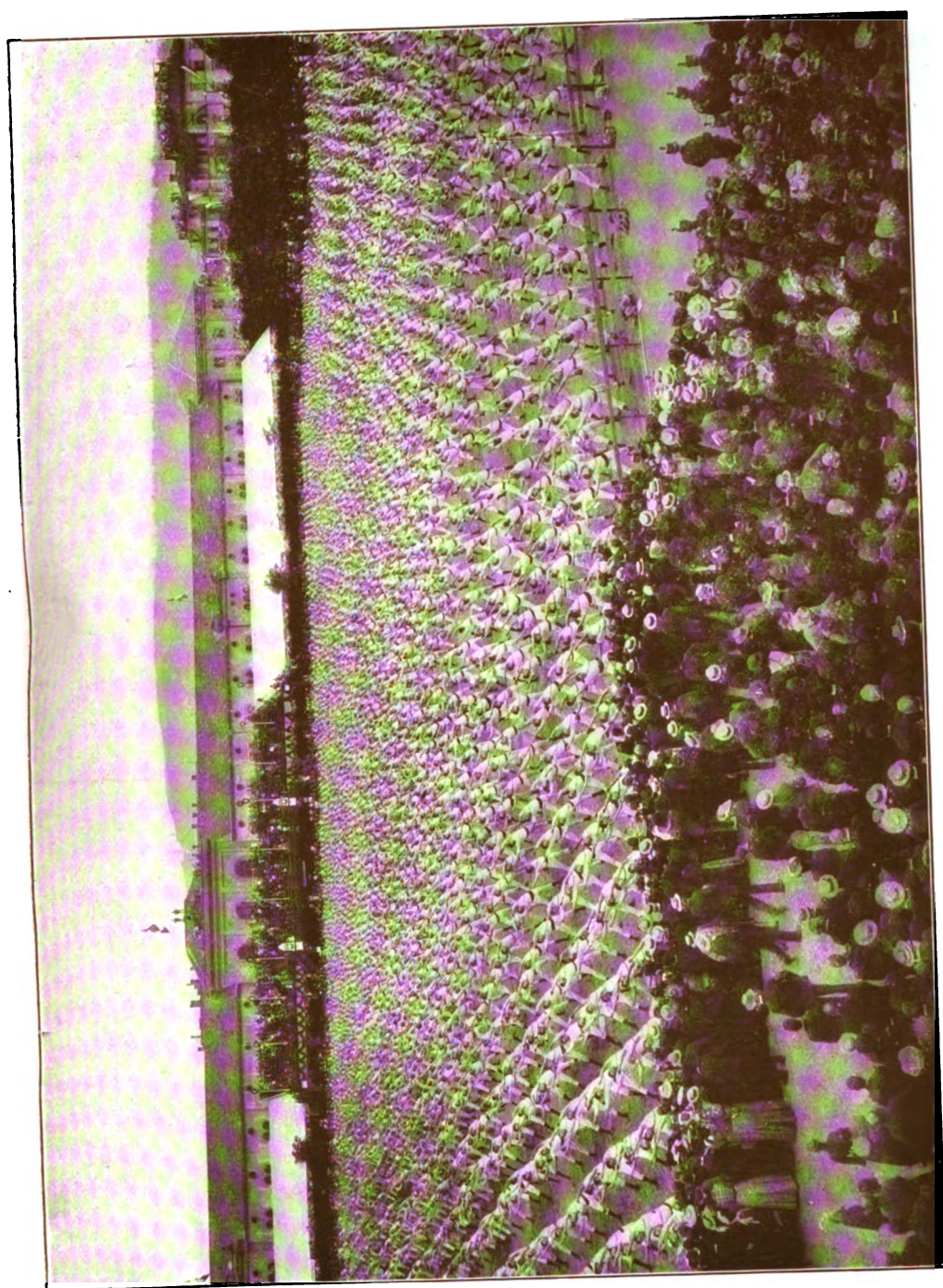
The masculine sports of cricket, football, quoits, boxing, wrestling, leaping, foot-racing, etc., have been for centuries enjoyed by the boys of England in the playgrounds attached to the schools. In 1848 the political condition of Europe enabled the Turnvereine to be reorganized and the German emigration to the United States has brought these institutions with it. The first society was formed in New York. The organization, as first established, was confined to the practice of bodily exercises; but soon assumed a higher scope. Libraries were collected, schools established, a newspaper ('Turnzeitung') founded; and various arrangements were made for the diffusion of useful knowledge, and for mental culture as well as physical training. Much credit must be given to Ling for his efforts to develop educational gymnastics. He has many followers, and his publication on 'Educational and Curative Gymnastics' has much merit. Ling has been severely criticised by English writers for his claims to originality. They go so far as to say that he simply used the works of authors of his time and of an earlier period, and took his *honus-bonus* from Dr. Francis Fuller in the 'Medicina Gymnastica.' The first edition was published in 1728, and it ran through eight others. It is also claimed that he borrowed in its entirety without acknowledgment, the work of one John Pough, 'A Physiological, Theoretic, and Practical Treatise on the Utility of the Science of Muscular Exercise for Restoring the Power of the Limbs,' with such materials and German gymnastics as had previously found their way through Denmark and Sweden. Through the exertions of such men as Salzmann, Jahn, and others, together with certain English authorities as, Fuller, Pough, Croft, Elias, Thomas and John Graham it was not difficult to establish a system. In fact Salzmann's gymnastics for youth needs only what Pough supplies to give all that Ling calls his system which is only adapted to beginners. The quality of the Ling exercises is stilted, and there is little scope for variety. The fact is, the system sticks too closely to automatic movements, which undoubtedly produce precise and studied monotony in drill.

Turning now to the Dio Lewis period, we see that it marks an epoch in the introduction of an American system of physical training formed in a small measure upon the Swedish and largely upon the German system. This system incorporated free-arm exercises, the use of dumbbells, clubs, rings, wands, together with what was then called the Pangymnastikon, but which was nothing more or less than a pair of flying rings equipped with a pair of detachable stirrups from which swinging, jumping, and stretching exercises were performed. Dio Lewis' work took up the matter of the school-desk, criticised the faulty position of the ordi-

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SWISS GYMNASTS, AT BERN.

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GYMNASTICS

nary desk, and the poor school-room ventilation. In 1861 the Normal Institute for Physical Education was incorporated and located in Boston. Its directors included many of the most distinguished educators of New England, and its departments of anatomy, physiology, and hygiene were in charge of able teachers. Dr. Dio Lewis gave the work in gymnastics. The aim of the institute was and is to furnish competent advocates and teachers of physical training.

Next follows the work of Dr. Sargent, with his American system of gymnastics. Dr. Sargent was born in Maine. He was fond of all kinds of outdoor sports and physical exercise, and joined a gymnasium club while attending high school; but as he had to work out of school hours to support his family, he could only attend to his exercising at odd moments as time permitted. On one occasion he broke a piece of apparatus and was expelled from the club. Piqued and aroused, he improvised an apparatus of his own in a barn. Shortly afterward the club gave a display and, after the members had finished, Sargent and a friend came forward and easily surpassed the athletic feats performed by the others. This event is said to have been the direct cause that led Dudley Sargent to become an ardent physical educator. He was graduated from high school in 1867, was invited to become teacher of gymnastics in Bowdoin College in 1869, and entered the college as a freshman in the regular course and conducted the physical work. In an endeavor to arouse the faculty and the public to the necessity for physical training, he was successful to the extent that, in 1871, gymnastics became a part of the regular curriculum, and Mr. Sargent, though a student only 22 years of age, was placed at the head of the department, and filled the position with credit. About this time he brought out his system of chest-weights. In 1872 he accepted a position as director of the Yale College gymnasium, and for three years had charge of both Yale and Bowdoin, spending part time in each place. It was while at Yale that he fully developed the "individual apparatus" for which he is so well known. At the solicitation of friends he went to New York and started a gymnasium on Fifth Avenue, which at once sprang into popularity. In 1879 he accepted the appointment of director of the Hemenway Gymnasium and assistant professor of physical training at Harvard University. This promotion of the department of physical training to a rank equal to the scholastic departments of the university was a great stride forward, and stamped the new system with the mark of public approval. To Dr. Sargent is the credit due for the invention of the chest-weight, the intercostal machine, quarter-circles, leg and finger machine, and other appliances to the number of 30 or more. He also elaborated a system of anthropometric measurements which enable an examiner to ascertain at once the physical condition of a student, and which guided a director in prescribing proper exercises for the development of deficient parts. Dr. Sargent believes in special work for individuals, and will not allow a man or woman to go into the gymnasium and take the drills and work with the apparatus indiscriminately. Health, harmony, and symmetry are the results aimed at.

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About the same time, physical training was taken up by and introduced into the Young Men's Christian Association, whose local gymnasias have done much to give the work a moral tone. We owe a great deal to such men as R. J. Roberts of Boston, whose name has been associated with the advancement of physical education since 1875, and whose dumb-bell drill and book of exercises has long been a standard in the association's work. The organization of the physical work under the auspices of the Y. M. C. A.'s has been practically responsible for the systematization of the American system of gymnastics, and for the establishment of a universal nomenclature of gymnastics. Among those who have done most for physical training along educational lines, I would mention Dr. Hartwell of Boston, Dr. Gulick of New York, and Dr. Seaver of Yale.

To-day, practically, all private schools have a well-equipped gymnasium under the direction of a man who has had special training in the application of exercise, the theory and practice of gymnastics, and who is, in many cases, a medical graduate. Systematic progressive courses of work are conducted, which aim to develop and strengthen, to give co-ordination and grace, and to make the individual self-reliant and resourceful. The equipment required to obtain this result is necessarily extensive, consisting of a gymnasium, say 50 x 100 feet, with clear floor space, high-vaulted roof, a fine system of ventilation, and with every variety of apparatus which the ingenuity of the specialists, and the energy and resourcefulness of the manufacturers, can provide. The equipment consists of light apparatus—dumb-bells, Indian clubs, bar-bells, wands; heavy apparatus—German horse, parallel bars (suspended and floor), horizontal bars (high and low), buck, flying rings, traveling rings, horizontal and vertical ladder, climbing ropes, rope ladders, spring-boards, beat-boards, floor-mats, wrestling and tumbling mats, Swedish stahl bars, booms, serpentine ladder, and balance-beams; as well as special apparatus—chest-weights, intercostals, quarter-circle, chest-expander, traveling parallels, wrist-machine, long inclined plane, sculling-machine, paddling-machine, leg-machine, neck-machine, bicycle-trainer, and so on through an almost endless variety. No plant is complete without its swimming-tank, varying in size from 15 x 45 up; its shower-baths, needle-baths, tub-baths; and some have steam-rooms and massage-tables. An indoor running track is an almost indispensable adjunct to all well-equipped gymnasias; and there should also be the equipment for indoor athletics during the winter months. Provision for indoor games is also essential—basket-ball, baseball, and ring-hockey. Each school has adjacent athletic grounds with tennis-courts, quarter-mile track, football and baseball fields, and golf course. See PHYSICAL CULTURE.

The college physical departments surpass those of the preparatory schools only in size and extent of equipment. Harvard University probably excels all others in point of variety of equipment for special work. The summer work in the public parks and school playgrounds must also be noted. These out-of-door gymnasias are equipped with extensive apparatus for all outdoor work. Preparatory school work in gym-

GYMNOPHIONA — GYRATION

nastics is, by general consent, made to consist of a system of corrective, body-building exercises, made up of free-arm work and light calisthenics in the lower grades, followed by heavier calisthenics, dumb-bells, clubs and wands, light apparatus, intermediate and advanced apparatus, boxing, wrestling, and fencing, interspersed with periods for recreative games, competitions, and contests of skill and strength.

Bibliography.—Alexander, 'Modern Gymnastic Exercises' (1890); Stebbins, 'Delsarte System of Expression' (1892); Posse, 'Special Kinesology of Educational Gymnastics' (1894); Ravenstein, 'Volksturnbuch' (1894); Broesike, 'Der Menschliche Körper, mit besonderer Berücksichtigung des Turnens' (1894); Nissen, 'Rational Home Gymnastics for the Well and the Sick' (1898).

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lyn, N. Y.*

Gymnophiona, jīm-nō-fi'ō-nā. See CÆCIL-
IANS.

Gymnosperm, jīm'nō-spērm, a plant with a naked seed. Among the gymnosperms are the cycads, gingkos, conifers, and *Genetaceæ*. The last group is represented by a single extraordinary tree or plant of West Africa (*Welwitschia mirabilis*), the stem of which, looking like a huge wood-fungus, may, when mature, be a little over a foot high but several feet across. It bears but two leaves, the cotyledons, which sometimes grow to be 5 or 6 feet long and 2 or 3 feet wide, ultimately splitting into strips. The plant is said to live over 100 years.

Gymnotus, jīm-nō'tūs. See ELECTRIC FISHES.

Gynæcology, in medicine and surgery, the science which treats of the physical organization of women and of the diseases peculiar to them.

Gyp, pseudonym of SIBYLLE GABRIELLE MARIE ANTOINETTE DE RIQUETTI DE MIRABEAU, COMTESSE DE MARTEL DE JANVILLE. See MARTEL DE JANVILLE.

Gypsophila, jīp-sōf'i-lā (BABY'S BREATH). A genus of European and Asiatic annual and perennial herbs of the natural order *Caryophyllaceæ*. They are highly valued and widely planted for their small flowers which, being upon branchy stems, give a pleasing effect to bouquets and a mist-like grace to flower-borders. They are of simplest culture upon somewhat dry soils, especially among rocks and in sunny situations. The perennial species are hardy. Six or more species and a few varieties are cultivated in American gardens and green-houses.

Gyp'sum, a native hydrated sulphate of calcium, having the formula $\text{CaSO}_4 + 2\text{H}_2\text{O}$; the water of crystallization being the only thing that differentiates it, chemically, from the orthorhombic mineral anhydrite. Gypsum is usually colorless or white. It crystallizes in the monoclinic system, contact twins and penetration twins being very common; and it also occurs in massive forms. The pure crystals

have a hardness of from 1.5 to 2.0, and a specific gravity of about 2.32. Gypsum is an exceedingly abundant substance, and is met with in many parts of the earth, and in a variety of forms. When found in the form of clear, transparent crystals, it is known as selenite; when the mineral is finely fibrous, and the fibres are parallel to one another so as to form a mass with a pearly opalescence, the mineral is called satin spar; when it occurs in uniform, fine-grained, translucent masses, it is known as alabaster; and when it occurs in large beds of massive rock, often mixed with clay, calcium carbonate, and other impurities, it constitutes the earthy gypsum, or rock gypsum, of commerce. Gypsum is soluble in from 400 to 500 parts of water at ordinary temperatures, but it dissolves more freely in hydrochloric acid. When heated, it loses part of its water of crystallization, though it retains the power of recombining with water to form a hard, non-crystalline mass, if the temperature to which it is exposed does not exceed 500° F. It is this property of recombining with water, which gives to dehydrated gypsum much of its industrial value. (See PLASTER OF PARIS.) When heated with charcoal, gypsum is converted into calcium sulphide, which dissolves readily in dilute acids, with evolution of sulphuretted hydrogen gas. In this way the sparingly soluble sulphate of calcium may be converted into the soluble chloride or nitrate of calcium. Gypsum, when pulverized, is used as a fertilizer, its efficiency in this respect being apparently due in large measure to the fact that it facilitates the decomposition of rocks containing alkaline silicates.

The production of gypsum in the United States in 1908, was 1,721,829 short tons, valued at \$4,138,560. Texas, Michigan, New York, and Iowa were the principal producing States. The United States ranks second in the world's production of gypsum, France being first, and Canada third.

Gypsy. See GIPSIES.

Gyra'tion, Radius of. The energy required to set a body in rotation in any given manner depends on the arrangement of the mass of matter to be rotated. Thus, a mass made into a ring like a wheel with very light spokes requires the expenditure of more energy in order to set it to rotate once per second on its axis than would be required if the same amount of matter were made into a uniform circular plate of the same radius. The energy required to set any given body in rotation about any given axis depends, in fact, on the "moment of inertia" of the given body about that axis; and the mass of the body being given, the moment of inertia depends on the way in which the mass is disposed about the axis of rotation. The radius of gyration about a given axis is the distance from that axis at which the whole of the matter of the given body might be concentrated without altering the moment of inertia. The moment of inertia and radius of gyration for any given body about any given axis may be calculated mathematically. The two magnitudes are evidently of great importance in the theory of rotating bodies.

GYROSCOPE

Gyroscope, jī'rō-skōp, from the Greek *gyros*, a circuit, *skōpéo*, I see. An instrument used in experimental physics for exemplifying the various properties of rotation and the composition of rotations. Its invention is ascribed to Jean Bernard Léon Foucault (1819-1868), whose famous experiments with pendulum and gyroscope proved and measured the diurnal motion of the earth. The application of the gyroscopic principle, however, was made many years previously to Foucault's experiments, and the instrument in some of its forms originated probably in Germany or France, towards the end of the 18th century. A form of the instrument is popular as a toy, in the familiar gyroscopic top. Since 1907 the gyroscopic principle has been adapted to the practical purposes of railroad transportation.

Freely supported on gimbals in a frame or in a box, the gyroscope consists of two inter-jointed wheels which revolve in opposite directions. As a rotating body will not alter the direction in which its permanent axis points, unless gravity intervenes, the action of gravity is eliminated by the opposing rotation within a rotation, of the central metallic disk, the middle point of whose axis constantly remains the centre of gravity of the machine. Upon this principle is explained the rotation of the earth on its axis, and the gyroscope thus affords a notable illustration of the harmony among physical laws. The gyroscope is so constructed that the axis of rotation can be made to point to some star in the sky. Then, as the heavy disk whirls round, it is found that the axis continues to point to the moving star, though, in consequence of this, apparently altering its direction relatively to bodies on the earth. If, again, the axis be pointed to the celestial pole, which is fixed, no alteration in its position relative to bodies on the earth takes place.

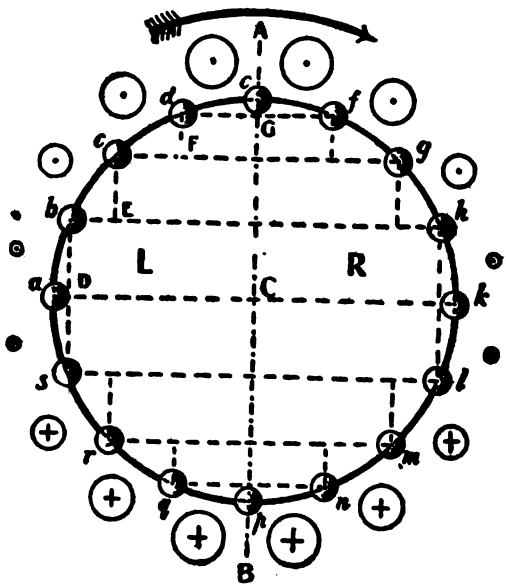
The following lucid and elementary exposition of the principles governing the action of the gyroscope is given by Dr. S. Tolver Preston in an article on 'The Mechanics of the Gyroscope' reproduced from *Technics* in the *Scientific American Supplement* of 8 Oct. 1904:

«According to the Newtonian system of dynamics (a system which is now universally recognized and accepted), the velocity of a particle can only be increased in any given direction by the application of a force acting in that direction; conversely, its velocity in a given direction can only be diminished by the application of a force acting in an opposite direction. The magnitude of the applied force is proportional to the rate of increase or decrease of the velocity of the particle.

Let us suppose that a series of equal heavy particles are arranged around the circumference of the circle in Fig. 1. These particles may be supposed to be rigidly connected one with another, the whole being connected by massless spokes, with an axle passing through *C*, the center of the circle; this axle being at right angles to the plane of the paper. This arrangement constitutes an ideal flywheel, and may be considered typical of an ordinary gyroscope disk.

Let the flywheel be set in rotation in the

direction indicated by the arrow. The problem before us is to determine the nature of the forces which must be applied to the rotating flywheel in order to deviate the axis of rotation. Let us suppose that the flywheel, while still rotating about its axle, is constrained in addition to turn about the line *AB*, at right angles to the axle. Looking in the direction *AB*, let the flywheel turn about that line in a clockwise direction, so that the side *L* moves downward through the plane of the paper, while the side *R* moves upward through the same plane. The particles at *e* and *f* being, at the given instant, on the axis of rotation *AB*, will possess no velocity of rotation about that axis. So far as concerns other particles, their velocities of rotation about *AB* will be proportional to their perpendicular distances from that line. Sixteen equidistant particles on the circumference of the circle have been indicated. The rotational velocities of these particles, about



the line *AB*, will be proportional to the respective perpendiculars let fall on *AB*.

In a certain interval of time the disk will complete a revolution about its axle. In one-sixteenth of this interval of time, the particle *a* will move round the circle so as to attain the position previously occupied by the particle *b*. In doing so, the particle *a* will acquire the velocity previously possessed by the particle *b*, i. e., its velocity will be diminished, since *b* is nearer than *a* to the axis *AB*. The diminution of velocity will of course be proportional to *aD*, where *bD* is a line drawn from *b* perpendicular to *CA*. But since the velocity of the particle *a*, in a direction passing vertically downward through the plane of the paper, is diminished as the particle moves from *a* to *b*, this particle must have been acted upon by a force directed vertically upward through the plane of the paper, and proportional to *aD*. This force is indicated by a small circle containing

GYROSCOPE

a dot at its center. The dot indicates the pointed end of an arrow supposed to be directed vertically upward through the paper; while the diameter of the small circle is drawn proportional to aD , or to the magnitude of the force.

While the particle a moved to b , the particle b moved to c . In this time the velocity of the particle b , perpendicular to the plane of the paper, must have been diminished by an amount proportional to bE . A small circle containing a dot at its center, and of a diameter proportional to bE , indicates the magnitude and direction of the force which must have been applied to the particle as it moved from b to c .

The force which acted on the particle c as it moved to d , and that which acted on the particle d as it moved to e , are represented in a similar manner.

Owing to the rotation about the line AB , all particles on the right-hand side of the disk are moving upward through the plane of the paper; thus it follows that the particle e , in moving to the position f , must have acquired a velocity, directed vertically upward through the paper, proportional to Gf . It must, therefore, have been acted upon by a force, proportional to Gf , directed vertically upward through the paper. The forces acting on the particles f, g, h , can be determined in a similar manner.

It is obvious that the velocity of the particle k , directed upward through the plane of the paper, is diminished as that particle moves to the position previously occupied by the particle l . Consequently, it must have been acted upon by a force, of which the magnitude is determined in the manner previously explained, acting downward through the plane of the paper. A circle, of which the diameter is proportional to this force, while the cross at its center represents the feathered end of an arrow directed downward through the paper, indicates the magnitude and direction of the force acting on the particle k as it moved to l . The forces acting on the particles, l, m, n, p, q, r, s , are determined similarly, and represented by circles containing crosses, to indicate that the forces act downward through the plane of the paper.

A glance at Fig. 1 shows that all forces acting on the part of the flywheel above the line ak , are directed upward through the plane of the paper; while all forces acting on the part of the flywheel below the line ak , are directed downward through the plane of the paper. All the forces acting above the line ak might be replaced by a single resultant force, acting upward through the paper at some point on the line Ce ; while all the forces acting below the line ak might be replaced by a single resultant acting downward through the paper at some point in the line Cp . These two resultant forces, acting parallel to each other, but in opposite directions, constitute a couple, and produce a torque or turning moment about the line ak . Thus, in order to turn the revolving flywheel about the diameter ep , we must apply a torque which, if it acted on the stationary flywheel, would turn it about the perpendicular diameter ak . Conversely, if we apply a torque tending to turn the flywheel about a diameter ak , it will turn, not about

ak (as might have been expected), but about the perpendicular diameter ep .

The torque necessary to deflect the flywheel might be produced by forces acting directly upon it, as for instance, by blowing air on the upper half of the flywheel from the back, and on the lower half from the front. Generally, however, it is more convenient to act on the axle, the end above the plane of the paper being urged in the direction CB , while the end below the plane of the paper is urged, by an equal force, in the direction CA .

Some further points should be noted. Any force acting to the right of the line AB , is equal, both in magnitude and direction, to a corresponding force acting to the left of the same line. Consequently as the flywheel turns about the axis AB , no work will be performed by the forces producing this rotation. This follows from the circumstance that whereas one force acts in the direction of motion (so far as relates to rotation about the axis AB) the other equal force is opposed to that motion.

The actual behavior of a gyroscope can now be easily understood. The flywheel aa (Fig. 2) having been set in rapid rotation in the direction indicated by the arrow r , the frame carrying it is supported from a projection n at one end, on a pivot o . Instead of falling to the ground, as it would do if it were not rotating, the gyroscope remains with its axis bs horizontal; but the axis turns in a horizontal plane about the point of support o , in the direction indicated by the arrow s . The torque produced by the pull of gravity is easily seen to be that required to turn the flywheel aa about a vertical diameter in the direction mentioned. The fact that the flywheel, besides rotating about a vertical axis, also revolves in a circle about the point o as center, is merely due to the circumstance that, under the conditions of the experiment, the rotation cannot occur without the revolution.

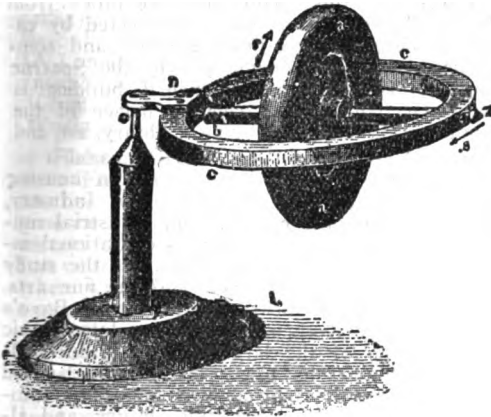
It is instructive to consider the same problem from a somewhat different standpoint. We have already determined the nature of the applied forces required to turn the ideal rotating flywheel (Fig. 1) about the axis AB , in a clockwise direction when viewed from A . We found that a torque must be applied which tends to urge the end of the axle above the plane of the paper in the direction CB , and the opposite end of the axle in the direction CA . It will now be proved that the reaction of the rotating flywheel, when it turns as above, about the axis AB , produces a torque which tends to urge the end of the axle above the plane of the paper in the direction CA , and the other end of the axle in the direction CB .

Under the given conditions, the component velocities, downward through the plane of the paper, of the particles a, b, c, d , are all being diminished; and the consequent reactions tend to turn the axle in a clockwise direction, about the line ka , when viewed from the side k . The component velocities, upward through the plane of the paper, of the particles e, f, g, h , are all being increased, and the consequent reactions tend to turn the axle in the same direction. It is easily seen that the reactions due to the alterations in the velocities of the particles k, l ,

GYROSCOPE

m, n, p, q, r, s , all tend to turn the axle of the flywheel in the same direction. Thus the torque due to the reaction of the rotating flywheel when turning about the axis AB , is of the character specified above.

"The precise way in which the gyroscope (Fig. 2) acts can now be readily followed. When the frame carrying the rotating flywheel a is first supported on the pivot o , the initial tendency is for the whole to descend toward the earth, under the action of gravity. But the pivot o prevents the end b of the axle from descending, so that an incipient rotation about a horizontal diameter commences. The reaction due to this rotation produces a torque which tends to turn the flywheel about a vertical diameter in the direction of the arrow s . As the flywheel is free to turn in this direction, it at once commences to do so, and in so doing generates a reacting torque opposing the incipient rotation produced by gravity. The action of gravity being opposed, the rate of (incipient) descent of the flywheel is diminished; but so long as descent continues, a torque acting in the direction of the arrow s will be produced,



and this will increase the velocity of turning, thus increasing the torque which opposes the descent of the flywheel under the action of gravity. The flywheel, finally, acquires a rotational velocity in the direction of the arrow s , which produces a reacting torque just equal and opposite to that due to the pull of gravity. If friction were entirely absent, the flywheel would then cease to descend, and would continue to turn at a uniform rate in the direction of the arrow s . In this process, the work performed is that due to the incipient descent of the flywheel; this work is just sufficient to supply the kinetic energy due to the rotation of the flywheel and its supporting framework about the axis o . When the permanent condition outlined above has been attained, no further work is done in the absence of friction. If there is friction between the supporting lug n , and the pivot o , the gyroscope will slowly descend, at such a rate that the work performed by gravity is just equal to that needed to overcome the frictional drag.

"In the absence of friction, it is obvious that the gyroscope turns about o as center merely

by virtue of its own inertia, after the final state has been reached; in this respect the motion resembles that of a planet around the sun. The torque due to gravity, though necessary, only serves the purpose of neutralizing the reacting torque which the turning of the flywheel about a vertical diameter produces."

Mr. C. M. Brownall also, in a treatise on 'The Gyroscope, an Explanation without Mathematics,' published in the *Scientific American Supplement* of 10 Aug. 1907, summarizes the action of the gyroscope force as follows:

"I. The gyroscopic force always acts at right angles to the plane of motion of the axis, neither accelerating nor retarding it and only tending to change its direction. The gyroscopic force is of the nature of a couple, and can only be balanced by an equal couple.

II. The gyroscopic force is greater, other things being equal; as the velocity of motion of the axis is greater, as the velocity of rotation of the wheel is greater, as the mass of the wheel is greater and as this mass is more distantly situated as regards the center of the wheel."

In May 1907, with a gyroscopic monorail car Mr. Louis Brennan, C. B., the inventor of the Brennan torpedo used by the British government, demonstrated before the Royal Society of Great Britain that he had discovered a practical application of the gyroscope which will probably revolutionize railway transportation.

The invention is, briefly, a system by which a vehicle or a train of vehicles supported by a single row of wheels may travel on a single rail and at all times maintain perfect equilibrium, whether in motion or stationary, and regardless of the distribution of the load, wind pressure and other conditions. Automatic stability mechanism carried by the vehicle itself endows it with this power. The mechanism consists essentially of two flywheels rotated directly by electric motors in opposite directions at a very high velocity, and mounted so that their gyrostatic action and stored up energy can be utilized. These flywheels are mounted on high-class bearings and are placed in exhausted cases, so that both air and journal friction is reduced to a minimum, and consequently the power required to keep them in rapid motion is very small. The stored up energy in the flywheels when revolving at full speed, is so great and the friction so small that if the driving current is cut off altogether they will run at sufficient velocity to impart stability to the vehicle for several hours, while it will take from two to three days before they come to rest. The model car, while running on a curved monorail, leans forward and so automatically balances the effect of centrifugal force, while a single wire hawser stretched across a river or ravine is all that is necessary in the shape of a bridge. The adoption of the gyroscopic principle to the practical purposes of steamship transportation is also in an advanced experimental stage, while it is considered probable that the crucial problem of the aeronaut, how to keep an automatic balance, may be solved by a simple application of the gyroscope.

H

H the eighth letter of the English and other alphabets derived from the alphabet of the Latins. It was borrowed by the Latins from the alphabet of the Greeks, and in early Greek represented an aspirate consonant sound, but in the Greek of classical times it stands for the prolonged vowel sound of *e*, as omega (ω) stands for the prolonged sound of omicron (\omicron). The H is evidently a character borrowed from the Phœnician alphabet, where its form was 𐤃 and its sound guttural aspirate, like that of the corresponding Hebrew letter *cheth* or like *ch* in German and in Scotch. In Greek, after H was adopted as a vowel sign, the aspirate was represented by ' or either prefixed to a letter ('o) or written above it (δ): it was previous to this change that H was introduced into the Latin alphabet. It is probable that in early Latin this letter, occurring between two vowels, as in *nihil*, *mihi*, *traho*, *veho*, represented a guttural sound, as the *h* in *nihil* and *mihi* does still in the Italian pronunciation of Latin. But evidence exists that in the classical usage of ancient Latin speech initial *h* was of little account and was "silent" as in modern Italian and French: this is certain as regards the pronunciation of the vulgar; and that even the educated often "dropped the h's" we know from the fact that in ancient monuments we find Hannibal and Annibal, Hadria and Adria, herus and erus, haruspex and aruspex.

In Anglo-Saxon and earliest English speech *h* represents a guttural aspirate like German and Scotch *ch* in *ach*, *loch*; for example, in *nicht* (night), *thoht* (thought) the *h* stood for the same sound as *ch* in the German words *nacht*, *gedacht*. In earliest English speech *h* was prefixed to *l*, *n*, and *r*, to represent a guttural aspirate which is now entirely lost; examples, *hlaf* (loaf), *hnecca* (neck), *hring* (ring): the initial guttural in such words has been dropped, as in the names of the early Frankish kings Hlodowig became Ludovicus and Louis, and Hlothar became Lothair. The original guttural *h* in old High German *hros* is completely eliminated in the modern German *ross*, but is represented by the aspirate *h* in Old English *hors* (horse). The *h* after *w* in many words as wharf, what, when, etc., represents an initial aspirate in Old English hwarf, hwaet, hwaenne, etc.

H is added to various consonants to form digraphs for representation of various sounds, for example, *ch* as in chin, *sh* as in shy, *gh* as in gherkin, *th* as in thin, then; or even to represent sounds for which there is already a proper consonant in the alphabet, for example *ph* and *gh* for the sound of *f* (philter, rough),

ch for the sound of *k* (chyle); in very many cases the digraph *gh* is employed simply as a memorial of an ancient etymology, as in plough, and not seldom for no discernible purpose at all, as in ghost; the form *rh* usually occurs in words of Greek origin, and recalls the Greek etymology (rhapsody), but again it is employed to suggest false Greek etymology (rhyme).

H. H. See JACKSON, HELEN MARIA FISKE HUNT.

Haarlem, hār'lēm, Holland, the capital of the province of North Holland, 11 miles by rail west of Amsterdam, and five miles from the North Sea. The city is intersected by canals bordered by tree-lined avenues, and communicates with the Zuyder Zee by the Spaarne and the Ij. Its chief municipal building is the town hall, a 17th century palace of the counts of Holland, containing a library, art, and historical collections. In Haarlem wood a favorite pleasure resort is the Pavilion housing the Society for the Promotion of Industry, and containing the colonial and industrial museums. Chief among numerous educational institutions is the Teyler Museum, for the study of theology, natural science, and the fine arts. The finest ecclesiastical structure is St. Bavo's or the Groote Kerk, a 15th century late Gothic basilica, one of the largest churches in Holland, noted for its tower 260 feet high, and its large organ. Haarlem was important commercially as early as the 12th century, and although its manufacturing industries have declined, has cotton-mills, linen bleacheries, type foundries, breweries, etc. The town suffered during the revolt of the peasantry in 1492 and was deprived of its privileges by Albert of Saxony. During the war of independence it sustained a siege of seven months (1572-73) by the Spaniards, and capitulated only after a display of the noblest heroism and courage. It was retaken by the Prince of Orange in 1677. Pop. about 70,000.

Haas, hās, Johannes Hubertus Leonardus de, Dutch painter: b. Hedel, North Brabant, 23 March 1832. A pupil of Jan van Os at Haarlem, he established his studio at Brussels in 1857, and attained an excellent reputation by his finely-colored animal studies and animal groups with background of Dutch landscape. In 1869 he received a gold medal at Munich for his 'Trio of Donkeys.' Others of his works are: 'The Three Comrades'; 'In the Dunes'; 'On the Bank of the Yssel'; 'Cattle at Pasture.'

Habakkuk, ha-bāk'ūk or hāb'a-kuk, the eighth of the twelve minor prophets. He was

HABBERTON—HABEAS CORPUS

of the tribe of Levi, and flourished about 600 a.c. His prophecy commences with a lamentation for the corruption and social disorganization which the prophet sees around him. He cries to God for help, and is answered by threatenings of swift vengeance. The prophet is commanded to write the vision of God's retributive justice as revealed to his prophetic eye. The doom of the Chaldeans is first told in general terms and the announcement is followed by a series of denunciations pronounced upon them by the nations whom they had oppressed. The whole concludes with a magnificent psalm (chap. iii.), 'Habakkuk's Pindaric Ode,' as it is called by Ewald, a composition unrivaled for boldness, sublimity, and majesty of diction.

Hab'berton, John, American author: b. Brooklyn, N. Y., 24 Feb. 1842. At first a printer he subsequently served in the Federal army, and later undertook editorial work in New York. His best-known book, 'Helen's Babies' (1876), attained great popularity both in America and in Europe. He has published also 'The Barton Experiment' (1877); 'Other People's Children' (1877); 'The Worst Boy in Town' (1880); 'Who was Paul Grayson?' (1881); a humorous 'Life of Washington' (1883); 'One Tramp' (1884); 'Brueton's Bayou' (1886); 'The Chautauquans' (1891); 'A Lonely Lover' (1893); 'The Tiger and the Insect' (1902); 'The Bowsham Puzzle'; 'Country Luck'; 'Little Guzz'; 'Caleb Wright'; etc.

Habeas Corpus, hā'bē-as kōr'pūs, an ancient English writ addressed to him who has another in custody, and commanding him to produce the body of the person named at a certain place and time. One of the purposes for which it was used was to recover freedom when wrongfully taken away. Personal liberty was asserted by the common law from its earliest ages, and it was always assailed by kings who would be absolute, and with an earnestness proportionate to their tyranny. Hence it became imperatively necessary, if subjects were to retain the control and disposition of their own persons, that they should demand a recognition of this principle from their sovereign, and in England the principle was declared in the most solemn manner in Magna Charta. It is there said that "no man shall be taken or imprisoned but by the lawful judgment of his peers, or by the law of the land." It became necessary, however, in the course of time to put down the abuses by which the government's lust of power, and the servile subtlety of crown lawyers, had impaired so fundamental a privilege; and this was effected by the Habeas Corpus Act passed in 31 Charles II. (1679). Of the political and social effects of this measure Blackstone writes: "If once it were left in the power of any, the highest magistrate, to imprison arbitrarily whomever he or his officers thought proper, there would soon be an end of all other rights and immunities."

The provisions of the act may be stated generally thus: (1) That on complaint or request in writing, by, or on behalf of, any person committed and charged with any crime (unless committed for treason or felony expressed in the warrant; or as, or on suspicion of

being accessory before the fact to any felony, or upon suspicion thereof, plainly expressed in the warrant; or unless committed or charged in execution by legal process), the lord-chancellor, or any of the judges in vacation, upon viewing a copy of the warrant or affidavit that a copy is denied, shall (unless the party has neglected for two terms to apply to any court for his enlargement) award a habeas corpus for such prisoner, returnable immediately before himself, or any of the judges; and upon the return made shall discharge the party, if bailable, upon security being given to appear and answer to the accusation. (2) The writ shall be returned, and the prisoner brought up within a limited time, according to the distance, not exceeding 20 days. (3) Officers and keepers neglecting to make due returns, or not delivering to the prisoner, or his agent, within six hours after demand, a copy of the warrant of commitment, or shifting the custody of a prisoner from one to another, without sufficient reason or authority (specified in the act), shall for the first offence forfeit £100; for the second £200, to the party grieved, and be disabled to hold their office. (4) No person once delivered by habeas corpus shall be recommitted for the same offence, on penalty of £500. (5) Every person committed for treason or felony may insist on being tried at the next assizes, or admitted to bail, unless the crown witnesses cannot be ready in that time; and if not tried at the second assizes or sessions, he shall be discharged from the imprisonment. (6) The prisoner may apply either to the Court of Chancery, or to the Courts of Queen's Bench, Common Pleas, or Exchequer, and any judge denying such writ is liable to a fine of £500. As the Habeas Corpus Act extended only to cases where persons are imprisoned on criminal, or supposed criminal charges, the other cases being left to the operation of the common law, which was found defective, the statute 56 George III. was passed, which extended the writ to other cases. Under this last act any person confined, or restrained of his liberty (otherwise than for criminal matters, and except persons imprisoned under a judgment or decree for debt), may apply to any judge of the common law courts for a habeas corpus, on showing by affidavit that there is a reasonable and probable ground for complaint.

In times of great political excitement, and suspected treasonable conspiracies, the operation of the Habeas Corpus Act has been suspended, as in Ireland in 1866, by 29 Vict. But such suspension does not enable any one to imprison without cause or valid pretext for so doing. It only prevents persons who are committed from being bailed, tried, or discharged during the suspension, leaving to the committing magistrate all the responsibility attending on illegal imprisonment. It is not uncommon therefore to pass an act of indemnity subsequently, for the protection of those who either could not defend themselves in an action of false imprisonment, without making improper disclosures of the information on which they acted, or who have done acts not strictly defensible at law, yet apparently justified by the necessity of the moment. The English statute has been copied in the United States without essential change.

In the Constitution of the United States it is provided that "the privileges of the writ

of habeas corpus shall not be suspended unless when, in cases of rebellion or invasion, the public safety may require it." The scope of this provision came under discussion during the Civil War when the President of the United States authorized Lieut.-Gen. Scott, where in his judgment it seemed necessary, to suspend the writ. When on one occasion the general refused to obey the writ, Chief Justice Taney, who had issued it, uttered an opinion in which he declared that it was only in the power of Congress, and not of the President, to proclaim such suspension, a view which legal authorities seem inclined to agree with.

It has been decided by the Supreme Court, in view of possible conflicts of jurisdiction between State and Federal courts, that no State judge has a right to issue a writ of habeas corpus for the release of a person held under the authority of the Federal government. On the other hand the United States courts are more restricted in the power to issue such writs than the State courts. A Federal court may issue a writ of habeas corpus in cases coming within Federal jurisdiction. The circuit court may decide whether the person ought to be discharged, but cannot do this even in cases where the writ has been suspended. There are also several provisions made by which an imprisoned person, whose testimony in a court of law is required, may be released by a writ of habeas corpus in order to appear before the judge. The Supreme Court has not the power to issue this writ, excepting in response to an appeal. Consult: Blackstone, 'Commentaries'; Hurd, 'Habeas Corpus.'

Haberstich, Samuel. See BITTER, ARTHUR.

Hackberry, an American tree of the elm family and genus *Celtis*, growing in dry woods throughout the eastern United States and Canada. It is small or middle-sized, with the aspect of an elm. The fruit (a globular drupe) is sweet and edible, as large as the bird-cherry, and ripening in autumn. Two species exist,—*C. occidentalis*, the northern hackberry, sugar-berry or nettle-tree; and a southern one (*C. mississippiensis*). The soft, coarse-grained yellow wood is of little value. It is affected by the same insects as injure the elm (q.v.).

Häckel, Ernst H. See HAECKEL.

Hackensack, N. J., city, county-seat of Bergen County, on the Hackensack River, and on the New York, S. & W., and Erie R.R.'s, 16 miles from New York. It is a residential city, but has brick, silk, and other manufacturing interests. It has a public library, high school, gas and electric light, waterworks, electric street railways connecting with surrounding towns and cities and with New York, and an assessed property valuation of over \$5,000,000. Hackensack was settled by the Dutch in the latter part of the 17th century, and during the Revolution was occupied in turn by the British and American armies. Pop. (1910) 14,050.

Hacker, Arthur, English artist: b. London 25 Sept. 1858. He studied at St. John's College, London, was a pupil in art of the Royal Academy and of Léon Bonnet at Paris (1880-1), set up his studio in London, and painted, besides several portraits: 'Pelagia and Philammon'; 'By the Waters of Babylon'; 'Væ Victis'; 'Syrinx'; 'Sir Percival'; and other works.

Hackett, Horatio Balch, American Baptist clergyman and educator: b. Salisbury, Mass., 27 Dec. 1808; d. Rochester, N. Y., 2 Nov. 1875. He was professor of biblical literature at Newton (Mass.) Theological Seminary 1839-70, and of Greek at Rochester Theological Seminary, from the latter date. He was one of the committee of New Testament revision, and with Ezra Abbot (q.v.) edited the American edition of Smith's 'Bible Dictionary' (1868-70). His chief work was a 'Commentary on Acts' (1851); and he also wrote 'Memorials of Christian Men in the War' (1864); 'Tour in the Holy Land' (1866); etc.

Hackett, James Henry, American actor: b. New York 15 March 1800; d. Jamaica, L. I., 28 Dec. 1871. He went on the stage in 1826 and was particularly successful in impersonating Yankees and Westerners, but was best known by his Falstaff, which he played first about 1832. He was widely popular in the United States as well as in England. He published 'Notes and Comments on Shakespeare' (1863).

Hackett, James Keteltas, American actor: b. Wolfe Island, Ontario, Can., 6 Sept. 1869. He is the son of J. H. Hackett (q.v.). He was graduated from the College of the City of New York in 1891, made his debut in 1892, became leading man of the Lyceum, New York, in 1896, and appeared in 'The Prisoner of Zenda,' 'Rupert of Hentzau,' 'The Pride of Jennico,' 'Don Caesar's Return,' and 'The Crisis.'

Hackettstown, N. J., town in Warren County; on the Musconetcong River and on the Delaware, L. & W. railroad and the Morris Canal; about 59 miles from New York city, and 50 miles west of Newark. It is about 800 feet above the sea and within half a mile of the highest point in the State. Its chief manufactures are silk goods, carriages and wagons, and agricultural implements. The waterworks are owned and operated by the town, and the supply comes from springs on Schooley's Mountain, distant from the town about two and one half miles. It is the seat of the Centenary Collegiate Institute, under the auspices of the Methodist Episcopal Conference of Newark. Pop. (1910) 2,715.

Hackländer, Friedrich Wilhelm von, frēd'rih vil'hēlm fōn hāk'lēn-dūr, German novelist and writer of comedies: b. Burtseid, near Aix-la-Chapelle, Prussia, 1 Nov. 1816; d. Leoni, near Munich, 6 July 1877. After serving for a time in the Prussian artillery he began a literary career with 'Pictures of Soldier Life' (1841), followed by 'Soldier Life in Peace' (1844). Other works of this period were 'Daguerreotypes' (1842); and 'Pilgrimage to Mecca.' In 1849 he went to Italy, where he was present with Radetzky's army during the campaign in Piedmont, and afterward published 'Soldier Life in War' (1849-50). Among the best of his longer novels are 'Trade and Traffic'; 'Eugene Stillfried' (1852); and 'Anonymous Histories' (1851). His best comedies are the 'Secret Agent' (1850), translated into several European languages, and 'Magnetic Cures' (1851). With Zoller, in 1885, he started the illustrated weekly 'Over Land and Sea.'

Hackley, Charles Henry, American capitalist: b. Michigan City, Ind., 3 Jan. 1837; d. Muskegon, Mich., 10 Feb. 1905. In 1856 he

HACKMATACK—HADIS

went to Muskegon, Mich., and worked in a lumber-mill as laborer and foreman; then attended a commercial school and was given a position as bookkeeper and later came to be partner with a mill firm. In 1880 he founded the firm of which he is the head, which is one of the most important in the State, and he has also been interested in many other industries. He has been a member of the board of education, and was elected regent of the University of Michigan, but declined the office. He has made large gifts to the city of Muskegon. In 1888 he gave a public library, which he endowed in 1891; in 1889 he had a park made in a central part of the city in which he erected a soldiers' and sailors' monument and other statues; in 1891 he built and endowed a manual training school; in 1901, he provided for the erection of a hospital with a training school for nurses, and erected a statue of McKinley, the first statue of the late President to be unveiled. The total value of his gifts is \$1,389,525.

Hackmatack, hăk'mă-tăk, the American larch. See LARCH.

Hackney, England, a metropolitan borough in the northeast of London, three miles north-northeast of St. Paul's. It has a fine modern town hall. Hackney was formerly noted for its boarding-schools for young ladies. It is supposed that hackney-coaches were first established between this place and London, and derived their name from it. It has manufactories of chemicals, india rubber, etc.; and had formerly extensive silk-mills. Pop. about 270,000.

Hackney Carriage or **Coach**, a four-wheeled enclosed vehicle drawn by two horses and seating four persons exclusive of the driver. They are usually let out for hire. The carriage derives its name from Hackney (q.v.).

Haddam, Conn., a town and one of the county-seats of Middlesex County, 26 miles southeast of Hartford, on the New York, New Haven & Hartford R.R., and on the west bank of the Connecticut River, 29 miles above its mouth. Among its educational institutions is Brainerd Academy. It has important granite quarries, lumber and saw-mills, and a paper mill. Pop. (1910) 1,958.

Haddock, a fish (*Melanogrammus aeglefinus*) of the same family (*Gadida*) as the cod, and much resembling it in general appearance. From the cod it may be easily distinguished by the black lateral line and suprapectoral blotches, and the swollen bones of the shoulder girdle. The haddock scarcely exceeds a weight of 15 pounds, and is usually about 3 or 4 pounds. It is restricted in its range to the North Atlantic. The food is extremely varied, consisting of every kind of bottom-living invertebrate. Spawning occurs in late winter and early spring, according to locality, and the eggs are essentially like those of the cod. Haddock associate with cod on the Banks, but the principal American fisheries are in Massachusetts Bay, on the Nantucket shoals and other points off southeastern New England, where immense numbers are taken on trawl and hand lines, especially during the summer. Philadelphia and Boston furnish the best markets for fresh haddock, but the demand from the interior is constantly growing. Though considerable quantities are salted at Province-

town, the haddock when so prepared is much inferior to the cod. The Scotch method of drying and smoking produces the much superior "Finnan Haddies," and is largely practised at Portland and Boston.

Had'don Hall, an old English baronial mansion, the seat successively of Avenells, Vernons, and the Rutland family, stands on a slope overlooking the Wye in Derbyshire, 23 miles north-northwest of Derby. The styles of architecture range from Norman to the 16th century. Reference is made to it in Scott's 'Peveril of the Peak.' Although it is not inhabited it is in fine condition and remarkable as one of the most interesting extant examples of the country house of a great land owner in the late Middle Ages.

Haddonfield, N. J., a borough of Camden County, five miles southeast of Camden, a junction of two branches of the Camden and Atlantic railroad. Its industries are mainly agricultural; and it has also manufactures of stoves, tinware, watchcases, etc. Pop. (1910) 4,142.

Ha'den, SIR Francis Seymour, English etcher and surgeon: b. London 16 Sept. 1818; d. Bradford, Eng., 1 June 1910. He studied at the Sorbonne and in the Paris and Grenoble medical schools, and in 1857 became a Fellow of the Royal College of Surgeons. The 'Etched Work of F. S. Haden' contains 185 plates by him and still others have been published in 'Etudes à l'Eau Forte' (1865-6). His work as an etcher is noted for both vigor and breadth. He was president of the Society of Painter Etchers, was knighted in 1894, and wrote 'Etched Work of Rembrandt' (1879-80); 'About Etching' (1881).

Hades, hă'déz, the Greek name of a god, in large measure corresponding to the Roman Pluto, who reigned over the infernal regions. Both Greeks and Romans supposed the infernal regions to be in the centre of the earth. To enter these, the river Styx had to be crossed by the dead in the wherry of Charon. If, by any chance, the body lay unburied, the shade was detained 100 years on the banks of the Styx before crossing.

The Greek word Hades is rendered in the authorized version by the ambiguous term hell (q.v.). Expressions, most of them obviously figurative, used of Hades, represent it as subterranean; as having gates with keys in the hand of Christ, and as having, in a portion of it, souls in torment.

Had'is, or in Arabic plural, AHADIS, narrations or traditions, which relate to the Prophet Mohammed, and are not found in the Koran. There are numerous collections of these floating traditions, anecdotes and legends. A search for such data was first undertaken by Abdul Malik ibn Juraisch (d. 772 A.D.). Others consider that the collection of Imam Malik (d. 801) is the earliest extant. The following six Hadis collections are considered by the Sunnite Moslems to be canonical scriptures: 1. The Hadis of Mohammed Ismail al Buchari (d. 878). 2. Of Muslim ibn ul Hajaj (d. 883). 3. Of Abu Isa Mohammed al Tirmisi (d. 901). 4. Abu Daud al Sajistani (d. 897). 5. Of Abu Abd ur Rahmân al Nasâi (d. 925). 6. Of Abu Abdallah Mohammed Ibn Wajah (d. 895). None of these have ever been printed.

HADLEY — HADRIAN

Hadley, Arthur Twining, American college president: b. New Haven, Conn., 23 April 1856. A son of James Hadley (q.v.), he was graduated from Yale in 1876, and took graduate studies in political science at Yale and the University of Berlin. In 1879-83 he was a tutor at Yale, and during that time wrote for several journals, including the 'Railway Gazette' and the 'Financial Chronicle.' He was commissioner of labor statistics for Connecticut (1885-7), and was in 1885 a witness before the Cullom State committee which prepared the Interstate Commerce Law. In 1886 he became professor of political science at Yale, and in 1899 was made president of the university. He was president of the American Economic Association for two years. In 1885 he published 'Railroad Transportation: Its History and Laws,' which is everywhere recognized as one of the chief authorities on the subject, and has been translated into French and Russian; his other works include 'Report on the Labor Question' (1885); 'Economics, an Account of the Relations between Private Property and Public Welfare' (1896), presenting the theories of political economy in accordance with the most modern research and thought; and 'The Education of the American Citizen' (1901). His writings show him to be not only a scholar, but also a man of affairs well acquainted with the business world, and in this regard he is one of the best representatives of the modern type of university presidents.

Hadley, Henry K., American composer: b. Somerville, Mass., 1871. He was a pupil of S. A. Emery and G. W. Chadwick in Boston, studied also in Vienna, and in 1895 returned to the United States and was appointed instructor in music at St. Paul's School, Garden City, L. I. His symphony, 'The Four Seasons,' received the prizes given by the Paderewski Fund and the New England Conservatory of Boston. His works further include a concert overture 'Hector and Andromache'; a symphony, 'Youth and Life'; a cantata, 'In Music's Praise'; a festival march; trios, quartettes, and more than 150 excellent songs and pianoforte compositions.

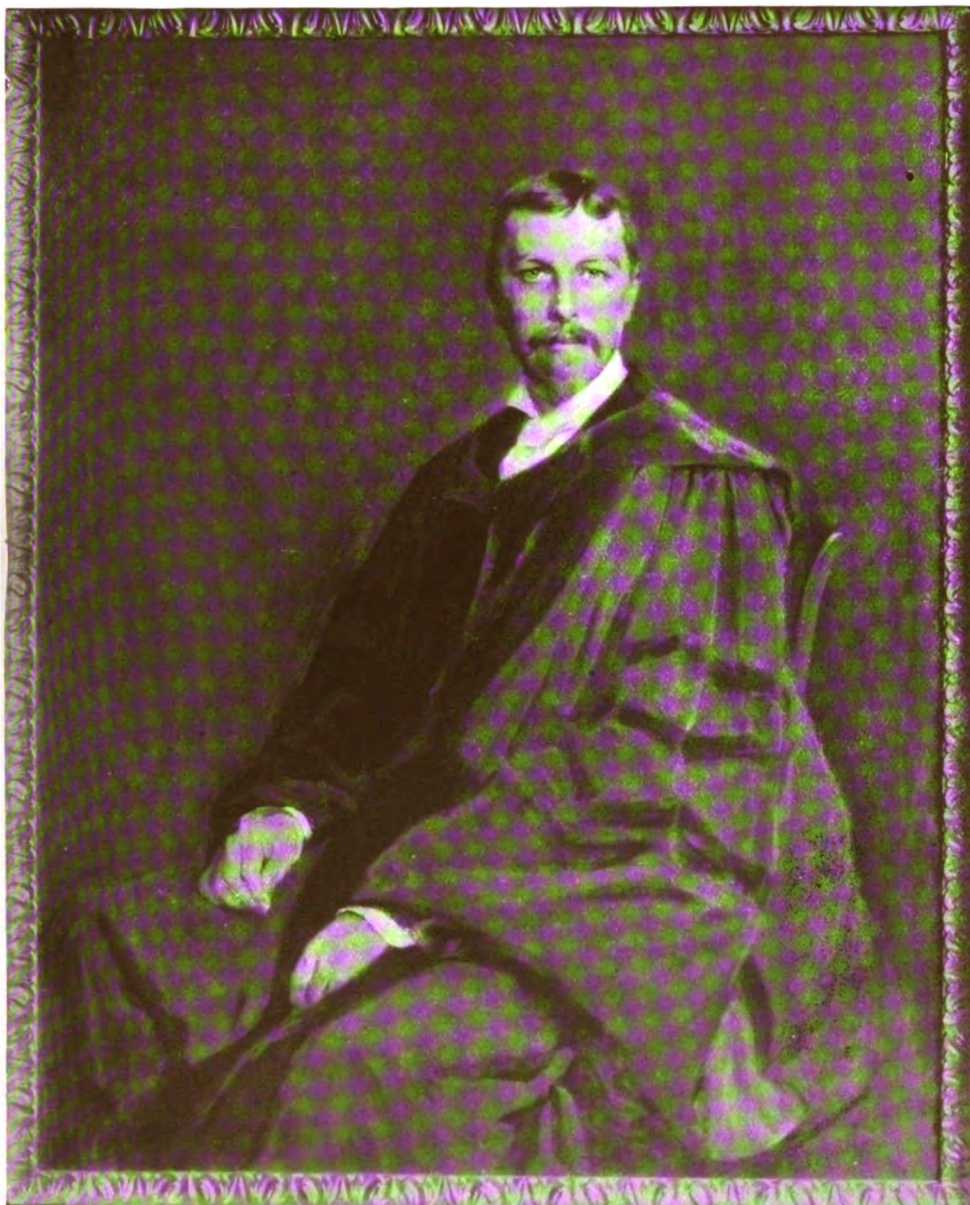
Hadley, James, American philologist: b. Fairfield, N. Y., 30 March 1821; d. New Haven, Conn., 14 Nov. 1872. When a boy he suffered an injury to his knee, which developed seriously, and crippled him for life. He was graduated from Yale in 1842, took graduate studies in mathematics and also a theological course. In 1844 he was tutor at Middlebury College, Vt., and in 1845 became a tutor at Yale. In 1848 he became assistant professor of Greek there, and in 1851, professor of Greek. He was familiar not only with Greek, Latin, and the chief modern languages, but also with Hebrew, Arabic, Armenian, Gaelic, Irish, Sanskrit, Gothic, and Old English, and won a high reputation as a linguist distinguished for exactness and thoroughness in detail, united with breadth of view; he also was successful and influential as a teacher. He published a 'Greek Grammar' (1861), based on Curtius, and wrote the 'Brief History of the English Language' in the 1864 edition of Webster's 'Dictionary'; after his death, his 'Introduction to Roman Law' (1873) and 'Philological and Critical Essays' (1873) were published.

Hadley, John, English mathematician and astronomer: b. 1682; d. 14 Feb. 1743. He became a Fellow of the Royal Society in 1717, and was the inventor of Hadley's quadrant (see **SEXTANT**) and of a reflecting telescope (1723). The credit of having invented the sextant is claimed for Hadley, Godfrey, and Newton, but each seems, nevertheless, to have made his own discovery independently. Hadley described his instrument, which he called an "octant," to the Royal Society in May 1731.

Hadley, Mass., town, which includes several villages, in Hampshire County; on the Connecticut River and on the Boston & M. Railroad; three miles northeast of Northampton and four miles southwest of Amherst. It was settled in 1659, and was first called Norwottack; but in 1661, when it was incorporated, it was given the name Hadley, from Hadley in England. William Goffe and his father-in-law Whalley, who fled from England to America in 1660, and who lived for a time near New Haven, sought concealment in Hadley, in 1664, where Goffe died in 1679. According to tradition, when Hadley was at one time attacked by Indians, and the people were called from the meeting-house, they stood helpless until Goffe appearing, took the lead and repelled the enemy. Hadley is an agricultural region, and its industries are chiefly connected with farm products. Pop. (1910) 1,999.

Hadramaut, hâ-drâ-mât', Arabia, the name given to the coast region from Aden to Cape Ras-al-Hadd. It consists of a plateau, parted from a mountain chain, the barrier of the interior desert, by a complex of valleys. Commerce, agriculture, cattle-breeding, and the chase are the chief occupations. The climate is dry but healthy. Pop. about 150,000.

Hadrian, ha'dri-an (PUBLIUS ÆLIUS HADRIANUS), Roman emperor: b. Rome 24 Jan. 76; d. Baizæ 10 July 138. For his ardor in the study of Greek he earned the nickname of Græculus. A nephew of Trajan, he was adopted by that emperor, fought under him against the Dacians with some glory, and, having been entrusted with the prefecture of the East and the command of the Roman armies in the East early in 117 when Trajan left the field, Hadrian, upon Trajan's death later in the same year was made emperor by his soldiers. He quickly realized that he could make no forcible head against the simultaneous attacks of the Parthians and, in Dacia and Moesia, of barbarian foes, to say nothing of revolt in Syria and Egypt. With the true insight of a diplomat he foresaw that the extreme East must be either surrendered voluntarily or lost, and chose the former alternative as the least costly. Hence he gave up Armenia, Mesopotamia, and Assyria, all comparatively new Roman provinces, to the Parthian power, and withdrew the Roman eagles to the west of the Euphrates. In 119, for the purpose of becoming acquainted with the state of the provinces, he began his celebrated journey, which he is said to have performed chiefly on foot, marching bareheaded 20 miles a day and sharing cheerfully the hard fare of the humblest soldier. He visited Gaul, Germany, Britain, where he built the famous wall extending from the Solway to the Tyne, Spain, Mauritania, Egypt, Asia Minor, and



ARTHUR TWINING HADLEY,
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HADRIAN'S WALL—HÆMATOXYLIN

Greece, whence he returned to Rome after his circuit of the empire in 126 or 127 A.D., and received the title of "Pater Patriæ." Hadrian spent the years 132 and 133 in Athens, which city he adorned with splendid and costly buildings. After once more visiting Syria and crushing a desperate Jewish revolt, he returned to Italy, and spent the last years of his life at Rome and his villa. During his reign the army was vigorously disciplined and reorganized. As a civil ruler he merits high praise for the just and comprehensive view he appears to have taken of his duties as a sovereign. Hence to him is attributed, more than to any other, the consolidation of the monarchical system of Rome. Hadrian also divided Italy into four parts under four consuls, to whom was entrusted the administration of justice. Hadrian had a passion for building: his most splendid edifices were a famous villa at Tibur (now Tivoli), and in Rome the Aelian bridge, built in 136, and now styled the Pont Sant' Angelo. This bridge leads to the emperor's splendid mausoleum, the Moles Hadriani. He likewise laid the foundation of several cities, the most important of which was Adrianopolis. He was a lover of the fine arts and set a high value on Greek literature. No fragment of ancient literature has been more famous than the verses attributed to the dying Hadrian:

Animula vagula, blandula
Hospes comesque corporis
Quæ nunc abibis in loca
Pallidula, rigida, nudula,
Nec ut soles dabis jocos?

David Johnston, in his 'Translations, Literal and Free, of the Dying Hadrian's Address to his Soul' (1877), gives no fewer than 116 translations of all degrees of excellence. Among well-known writers, Byron, Prior, Pope, and Merivale have attempted renderings. Consult: Gregorovius, 'Der Kaiser Hadrian' (1884); Durr, 'Die Reisen des Kaisers Hadrian' (1881).

Hadrian's Wall, a wall in the north of England, called also the Roman Wall and the Wall of Severus. Before Agricola advanced into Scotland he established forts between the estuary of the Tyne and the Solway Firth, to protect him from attack in his rear. He adopted the same precaution before leaving the Lowlands of Scotland for the Highlands, placing encampments between the firths of Forth and Clyde. Afterward walls were constructed on these two lines. On the English side of the Border is a stone wall with a ditch on its north side. Attached to it are stationary camps, mile-castles, and turrets for the accommodation of the soldiery who manned it. To the south of the stone wall is a series of ramparts generally called the *vallum*. This fortification consists of three aggers or mounds and a ditch. The military way along which the soldiery moved lies between the *muris* or stone wall and the *vallum*. The wall was not intended as a mere fence to block out the Caledonians, but as a line of military strategy. Hadrian is now generally believed to have been the builder of the whole structure. Severus, however, repaired it before he advanced into Scotland. Agricola came to Britain in 78 A.D. Hadrian came toward the close of 119 A.D. Severus died in 211 A.D. Considerable portions of Hadrian's Wall yet remain. In two places the wall stands nine feet high. See Collingwood Bruce, 'The Roman Wall' (1851); and

'Handbook to the Roman Wall' (1863); Neilson, 'Per Lineam Valli' (1891); Creighton, 'Carlisle' (1889).

Hadrosaurus, hăd-rô-să'rûs, or Trachodon, a genus of duck-billed dinosaurs of the Cretaceous rocks of North America. Compare CLAOSAURUS.

Haeckel, hêk'êl, Ernst, German naturalist: b. Potsdam, Germany, 16 Feb. 1834. He studied at Berlin, Würzburg, and Vienna, taking his medical degree in 1858 and practising that profession a short time in the former city. During 1859 and 1860 he made a journey through Italy and Sicily in the interest of science, his work on 'The Radiata' (1862), being a result. Later portions were added in 1887 and 1888. In 1861 he settled in Jena for the study of comparative anatomy, but soon turned to the specific investigation of zoology, and after holding subordinate positions, was appointed in 1865 full professor at Jena. His researches had to do especially with the lower ranks of marine animals, and above all, with deep-sea life in its simplest forms. The material for such study was gathered from many and extended experiences in the North Sea, the Mediterranean, the Canary Isles, and the Indian Ocean. These travels and researches were the basis of works like the 'History of the Development of the Siphonophora' (1869); and 'Biological Studies' (1870). These, however, were introductory to greater representative works on natural philosophy and the development theory, such as 'Calcareous Sponges' (1872); 'Natural History of Creation' (1868),—which has received the honor of translation into twelve languages,—and his master work 'General Morphology of Organisms' (1866). More popular writings, making him known to a public much wider than the biologist ever addresses, are those 'On the Division of Labor in Nature and Human Life' (1869), 'On the Origin and Genealogy of the Human Race' (1870), 'Life in the Great Marine Animals'; 'The Arabian Corals' (1873); 'The System of the Medusa' (1880); and 'A Visit to Ceylon.' For many years he has devoted his attention to the deep-sea explorations of H. M. S. Challenger expedition, of which he has written voluminous reports in English. His general biologic conclusions regarding the life and growth of deep-sea organisms are given in his 'Plankton Studies' (1890), while his 'Monism as the Link between Religion and Science' may be considered as in a certain sense his confession of faith.

Hæmatemesis, hê-mă-têm'ê-sis, vomiting blood, which comes from the stomach, or œsophagus. It may result from alcoholism, poisoning, or cirrhosis of the liver. It is more frequent in later life than hæmoptysis (q.v.) but may occur in the acute perforating ulcers of the stomach in young women. It is frequently associated with cancer, but it results also from external violence.

Hæm'atin, or Hem'atin. See HÆMOGLOBIN.

Hæmatoxylin, hê-mă-tăx'ô-lin (C₁₆H₁₄O₆), the coloring matter of logwood, or *Hæmatoxylin Campechianum*, got from the extract by allowing it to stand some days in contact with ether, decanting, removing the ether, and adding water. Hæmatoxylin gradually deposits, and the crystals by pressure and recrystallization from water containing a little ammonium sulphite can be

HÆMATURIA—HÆMORRHOIDS

got nearly colorless. Combined with three molecules of water it forms dimetric, with one of water trimetric crystals. The crystals are large, transparent, and brilliant, and have a sweet taste. Hæmatoxylin dissolves sparingly in water, but it is taken up very freely by solution of borax, by hypo-sulphite of sodium, phosphate of sodium, and some other salts. It is also soluble in ether and in alcohol. By acids it is not readily affected, but it reacts at once with alkalies, forming colored solutions, and with metallic oxides forming precipitates of various colors. By joint action of air and bases hæmatoxylin is oxidized and becomes transformed into hæmatein.

Hæmaturia, hem-a-tū'ri-a, the presence of blood in the urine, which points to disease of the kidney or bladder. It is a symptom of some gravity. The treatment of the cause will probably remove this affection; in all cases complete rest is very important. See TREMATODA.

Hæmoglo'bin, or **Hemoglo'bin**, an organic coloring matter, which constitutes about nine tenths of the weight of dried red blood corpuscles, and serves as a carrier of oxygen from the lungs to the general tissues of the body. It is an exceedingly complex substance, and its formula is not certainly known. Zinoffsky gives it as $C_{75}H_{1100}N_{214}S_2FeO_{345}$; but this can hardly be regarded as more than a guess. According to many authorities, hæmoglobin is not a definite chemical compound, but a more or less variable mixture of simpler substances. It gives all the general reactions of the proteids, but, unlike most of the proteids, it may easily be obtained in crystalline form, its crystals commonly occurring in rhombic plates or prisms, varying somewhat in shape, according to the source from which the substance is prepared. The exceeding physiological importance of hæmoglobin depends upon the fact that it readily combines with oxygen to form a very unstable compound known as oxyhæmoglobin. The combination takes place as the blood corpuscles containing the hæmoglobin pass through the lungs; and the loosely-combined oxygen is given off again as the corpuscles pass through the capillaries, the oxyhæmoglobin being thereby again reduced to hæmoglobin. Hæmoglobin also combines with carbon monoxid to form a similar but far more stable substance known as carboxyhæmoglobin. In poisoning by the inhalation of coal-gas the carbon monoxid present in the coal-gas combines with the hæmoglobin in the lungs, and the carboxyhæmoglobin so formed does not break up again. As the absorption of the coal-gas proceeds, a continually increasing quantity of hæmoglobin is therefore destroyed, so far as its utility as an oxygen-carrier is concerned. In extreme cases of such poisoning, transfusion of blood is resorted to, in order that the patient may have a sufficient supply of hæmoglobin to transport the requisite quantity of oxygen from the lungs to the other tissues of the body.

The preparation of pure hæmoglobin is a difficult operation, and for its details reference should be made to Gamgee's 'Physiological Chemistry.' One of the best methods that have been proposed consists in adding to defibrinated blood about one sixteenth of its own volume of ether, and shaking the mixture. This treatment causes the red corpuscles to break up, and the fluid becomes lake-colored. After a time, vary-

ing from a few minutes to three days, according to the source of the blood, a heavy deposit of minute crystals of oxyhæmoglobin is thrown down. This may be purified by washing with 25 per cent alcohol, and subsequent recrystallization. Crystals of hæmoglobin itself have also been prepared. Pure hæmoglobin has a purplish color, which gradually passes into a scarlet or a yellowish red, as the substance absorbs oxygen and becomes thereby converted into oxyhæmoglobin. Carboxyhæmoglobin is even more brilliantly red than oxyhæmoglobin. All three of these substances exhibit marked absorption spectra when in solution, and very small quantities of them can be easily detected by the spectroscope. It is said that the presence of one part of hæmoglobin in ten thousand parts of water can be distinctly demonstrated by this means.

When oxyhæmoglobin is acted upon by acids or alkalies, or by the gastric juice, it is resolved into a proteid substance and a definite compound which has the probable formula $C_{60}H_{70}N_{10}Fe_2O_{10}$ and is known as hæmatin. Hæmatin may be best prepared by extracting blood clot, directly, with hot alcohol to which a small quantity of sulphuric acid has been added. The extract is next agitated with chloroform, which takes up the hæmatin. The chloroform is then separated, washed with water to remove the acid, and allowed to evaporate, when the hæmatin is deposited in the form of a bluish-black powder. Hæmatin is a very stable compound, and may be heated to 350° F. without decomposition. At higher temperatures it burns with evolution of hydrocyanic acid, leaving an ash composed chiefly of oxid of iron. It is insoluble in water, ether, dilute acids, and pure alcohol; but it dissolves readily in solutions of the caustic alkalies, and in alcohol to which a small quantity of sulphuric acid has been added. Consult Gamgee, 'Physiological Chemistry.'

Hæmophilia, a congenital inherited disease characterized by a tendency to obstinate bleedings. Women are very rarely affected, but transmission of the disease seems to be from the father through the daughters to the grandsons, and from father to son. The disease usually makes itself evident in early life, a slight wound being followed by abnormal hemorrhage, whereby the child becomes known as a "bleeder." The exact fault in nature's ordinary method in plugging blood-vessels has not been discovered; the shed blood will clot naturally. Besides the liability to excessive hemorrhage, these subjects are frequently afflicted with trouble in the joints, probably a chronic inflammation, the result of repeated small hemorrhages. Death is always imminent, as nothing can stop the flow of blood where large areas of the body are injured. Chlorides are used with some success for those mildly afflicted with the disease, particularly the chloride of calcium.

Hæmop'tysis, expelling blood from the lungs, larynx or bronchial tubes by coughing, which may be a symptom of phthisis. Morphine is useful immediately after such hemorrhages, but modern medicine rejects the use of styptics.

Hæmorrhoids (Greek, *haima*, blood, and *rheo*, to flow), literally, a flow of blood. Until the time of Hippocrates this word was used, conformably to its etymology, as synonymous with hemorrhage. It was afterward used in a

narrower sense, to indicate the flux of blood at the extremity of the rectum, and in some other cases which were considered analogous to it; thus it was applied to the flow of blood from the nostrils, the mouth, the bladder, and the uterus. It is at present used to signify a particular affection of the rectum, although the disease is not always attended with a flux; in this sense the affection is also called piles. Certain general causes may produce a predisposition to this disease; in some cases, it appears to be the effect of a hereditary disposition; in general, it manifests itself between the period of puberty and old age, although infants and aged people are not entirely exempt from its attacks. Men are oftener affected than women, in whom it is sometimes produced by local causes. It often shows itself in subjects who pass suddenly from an active to a sedentary life, or from leanness to corpulency. Any circumstance which produces a tendency to pressure on the venous return of blood in the pelvis is to be reckoned as a local cause. The accumulation of fecal matter in the intestines as in habitual constipation; efforts to expel urine; the pressure produced by polypi; the obstruction of any of the viscera, especially of the liver; worms; use of drastic purges, particularly of aloes; long continuance in a sitting posture; riding on horseback; pregnancy; the accumulation of water by ascites;—such are some of the ordinary causes of hæmorrhoids.

Several varieties of hæmorrhoids are distinguished. They are known as external when apparent at the anus; internal when concealed within the orifice; blind or open, regular or irregular, active or passive, periodical or anomalous, etc. There is also a great difference in the quantity of blood discharged; it is usually inconsiderable, but in some cases is so great as to threaten the life of the subject. The quality, color, etc., of the blood, also differ in different cases. The number, seat, and form of the hæmorrhoidal tumors likewise present a great variety of appearances. When the disease is purely local it is cured more readily; but in the greatest number of cases it is connected with some other affection, or with the constitution of the subject. In these cases, if the piles are not troublesome on account of their size, or if the bleeding is not very considerable, cure of the primary affection should be attempted. The best mode of treatment is then to recur to hygienic rather than medicinal influences. The subject should avoid violent exercises, but moderate exercise will be found beneficial. The standing position is to be avoided as much as possible, especially following defecation. The constipation (q.v.) with which the subjects of this disease are liable to be affected should be remedied by hygienic dieting. If the pain is considerable, recourse should be had to sedatives and local application of hot water. If the disease appears under a more severe form, more violent remedies will become necessary. If the discharge of blood becomes excessive, particular care must be taken to regulate it. If the tumors acquire a considerable volume, surgical operations are necessary. At the present time the operative treatment of persistent hæmorrhoids is both safe and efficacious.

Hafiz, hâ-fiz', the pseudonym of MOHAMMED SHEMS ED DÛN, Persian poet: b. Shiraz in

the beginning of the 14th century; d. 1388. The surname Hafiz was given him because he knew the Koran by heart. He was also called *Shakar-lab* (Sugar-lip), from the flowing melody of his ghazals or short lyrics; and *Lissan Elghâib* (the Mysterious Voice), from the deep mystic meaning said by his warmest admirers to be contained in many of his poems. He preferred independent poverty as a dervish to a life at court, whither he was often invited by Sultan Ahmed. He became a sheik or chief of a fraternity of dervishes, and died at Shiraz where a monument was erected to him, still frequently visited by pious Moslems. He is the greatest lyrical poet of Persia, and he furnishes the safest guide to Persian thought and manners. The songs of Hafiz were collected into a *Divan* (a Persian word for a collection of poems) after his death, which was first published at Calcutta in 1791, and translated into German by the celebrated orientalist Hammer-Purgstall (1812-13). A complete English translation by Clarke appeared in 1891. A critical edition of the Persian text, with scholia, etc., was published by Hermann Brockhaus (1854-61). Consult Horn, 'Geschichte der persischen Litteratur' (1901).

Hag-fish, a name given to the species of the families *Heptatremida* and *Myxini* *Myxine*, and *Bdellostomia* of the class of Cyclostomi (q.v.). They are eel-like in shape, lack all paired fins, have a suctorial mouth, without jaws; a single nostril at the tip of the head and either one (*Myxine*) or from 6 to 14 (*Polistotrema*) gill openings along the sides of the body. Around the mouth are eight barbels, and the nostril connects with the cavity of the mouth. The skin contains numerous mucus-glands and also numerous pockets of "thread cells," the protoplasm of which is converted into long threads, which, when discharged, unwind and, together with the mucus, form a jelly-like mass protecting the animal. The eggs are large, oval in shape and enclosed in a horny case provided with hooks on each end by which they are anchored to sea weed, etc., on the bottom. Where abundant the hag-fishes are among the greatest pests of the fishermen. They attach themselves to other fishes in the neighborhood of the gills or on the eyes, and thence work themselves rapidly into the interior of the body, devouring the viscera, muscles, etc., so that there remains "a living hulk of head, skin and bones." The California hag-fishes (*Polistotrema Stouti*) will devour a fish of 10 or 15 pounds in a single night, and it is believed that they enter the fishes after they are taken in the nets. The hag-fish of the eastern coast (*Myxine glutinosa*) ranges north of Cape Cod, and in the European seas, south to the English Channel. Other species occur in other parts of the world.

Hagar, hâ'gar, an Egyptian handmaid in Abraham's house. She was presented by her mistress Sarah to Abraham, in order that Abraham might not die without descendants, Sarah herself being barren. Hagar bore Ishmael; but Sarah soon became jealous of her, and treated her severely. When Sarah bore Isaac, Hagar was sent away by Abraham, who, the Bible informs us, had received a divine order to dismiss her. She suffered much distress in the desert, but was relieved by an angel, and married her son to an Egyptian woman.

HAGEN — HAGOOD

Hagen, Gotthilf, göt'hilf hä'gën, German hydraulic engineer: b. Königsberg, Prussia, 3 March 1797; d. Berlin 3 Feb. 1884. He studied at the University of Königsberg; in 1816 observed at Kulm the total eclipse of the sun, but later turned his attention from astronomy to engineering, and from 1831 to 1849 was professor of hydraulic engineering in the School of Engineering. The naval harbor of Wilhelmshafen, one of the strongest on the German Ocean, was built from his designs. In 1869 he became director of the Prussian building department. His most important work is his 'Handbuch der Wasserbaukunst' (1841-65), besides which he published numerous other volumes, including: 'Die Kanalisierung der obern Saar' (1866), and 'Untersuchungen über die gleichförmige Bewegung des Wassers' (1876).

Hagen, Theodor, tä'ö-dör, German painter: b. Düsseldorf 24 May 1842. He became known through his landscapes of the Eifel Mountains and Westphalia, in 1871 was appointed professor in the Weimar art school, of which he was also director from 1877. In 1881 he resigned both posts and returned to Düsseldorf. He obtained a gold medal at the Berlin exposition of 1891. Among his works, distinguished by their forceful drawing and excellence of aerial perspective, are: 'The Kanderthal in Switzerland'; 'Sunset in the Siegenthal'; 'Spring Weather'; 'Swiss Landscape, with the St. Gothard Pass'; 'Town on the Lower Rhine — Evening.'

Ha'gerstown, Md., city, county-seat of Washington County, on Antietam creek, and on the Baltimore & O. the Cumberland V., the Norfolk & W. and the Western M. R.R.'s. Here are extensive manufactures of knit goods, bicycles, machinery, steam engines, lumber, etc. It is the trade centre of western Maryland and contains a court-house, high school, Bacon's School for boys and girls, electric light and street railways, three national banks, and an assessed property valuation of \$7,000,000. Pop. (1910) 16,507.

Haggadah, ha-gä'da, one of two rabbinical biblical interpretations forming the Midrash (q.v.).

Haggai, hä'g'i, the tenth of the minor prophets, and first of those who prophesied after the captivity. He was born in Babylon, and joined the first band of exiles who, on the issue of the decree of Cyrus (536 B.C.) returned to their own land. He was buried among the priests at Jerusalem, as belonging to the family of Aaron. The book of Haggai consists of four distinct prophecies and has but one theme, the building of the second temple. The brevity of the several prophecies is so great, and the poverty of expression which characterizes them so striking, as to give rise to an idea that in their present form they are but the outline or summary of the original discourses. They were delivered in the second year of Darius Hystaspes (520 B.C.), at intervals from the first day of the sixth month to the twenty-fourth day of the ninth month in the same year. The closing prediction foreshadows the establishment of the Messianic kingdom upon the overthrow of the thrones of the nations.

Haggard, hä'g'ard, Andrew Charles Parker, English novelist: b. Bradenham Hall,

Norfolk, 7 Feb. 1854. He is a brother of H. R. Haggard (q.v.) and besides serving with distinction in the English army has published 'Dodo and I'; 'Polyglot Poems'; 'Under Crescent and Star'; 'Love Rules the Camp,' and other books.

Haggard, Henry Rider, English novelist: b. Bradenham Hall, Norfolk, England, 22 June 1856. At 19 he went as secretary to Natal, and served on the staff of Theophilus Shepstone during his mission to the Transvaal in 1877. In 1884 he was admitted to the bar of Lincoln's Inn, but has devoted his time mainly to authorship and agriculture. His novels of South African life have attained a wide popularity both at home and in the United States. Among his works are: 'Cetewayo and His White Neighbors' (1882); 'Dawn' (1884); 'The Witch's Head' (1885); 'King Solomon's Mines' (1886); 'Jess' (1887); 'She' (1887); 'Allan Quatermain' (1888); 'Colonel Quaritch, V. C.' (1888); 'Cleopatra' (1889); 'Beatrice' (1890); 'Montezuma's Daughter' (1894); 'Doctor Thorne' (1898); 'History of the Transvaal' (1900); 'Lysbeth' (1901); 'Rural England' (1902); 'A Gardener's Year' (1905); etc.

Haghe, Louis, loo-ë häg, Belgian painter and lithographer: b. Tournai 17 March 1806; d. London 9 March 1885. At first an architect, he turned to landscape painting, in 1832 went to London, there as a lithographer entered partnership with William Day, then became interested in water-color painting, and in 1873-84 was president of the New Water Color Society. He painted by preference old Flemish interiors, such as 'Audience Chamber at Bruges,' but also scenes from English history ('Cromwell with the Letter of Charles I.'), and other subjects. In oils he was less successful. He worked entirely with his left hand.

Hagiographa, hä-jī-ög'ra-fa, a Greek word, signifying sacred writings, first introduced by Epiphanius as the rendering of the Hebrew word *Ketubim* = writings. The third and last great division of the Old Testament books, the others being Torah (the Law) and Nebiim (the Prophets). The three-fold division is alluded to in the New Testament, the several parts being described as "the law" or "Moses," "the Prophets," and "the Psalms" (Luke xxiii. 44). In this passage the Psalms are the Hagiographa. When the division is twofold, the Law and the Prophets, the Hagiographa are merged in the second category (Matt. v. 17, xi. 13). In our present Hebrew Bibles the Hagiographa consist of 13 books thus arranged: Psalms, Proverbs, Job, Song of Solomon, Ruth, Lamentations, Ecclesiastes, Esther, Daniel, Ezra, Nehemiah, and I. and II. Chronicles, but the list is otherwise drawn up by many authorities.

Hagonoy, hä-gō-noi', Philippines, a pueblo of the province of Bulacán, island of Luzon, on the Grande de la Pampagna River, about three miles from Manila Bay, seven miles southwest of Malolos. Lake Hagonoy is partly within the precincts of the town; this lake dries up in the summer season, so that the lake bed can be cultivated. Pop. 20,100.

Ha'good, Johnaon, American soldier: b. Barnwell, S. C., 21 Feb. 1829; d. there 4 Jan. 1898. At the beginning of the Civil War he entered the Confederate army and in 1862 be-

HAGUE

came a brigadier-general. He fought against Gillmore at the siege of Charleston (1863), and was commander of Battery Wagner. With his brigade he participated in the battle of Cold Harbor, and subsequently was in the trenches at Petersburg. He took part also in the operations north of the James after the surrender of Fort Harrison, and commanded Bragg's rear guard at Fort Fisher.

Hague, häg, Arnold, American geologist: b. Boston 3 Dec. 1840. He was graduated at the Sheffield Scientific School of Yale (1863); studied three years at the universities of Göttingen and Heidelberg, and in 1867 was appointed assistant geologist on the United States geological exploration of the 40th parallel. His published works are: 'The Volcanoes of California, Oregon, and Washington Territory' (1883); 'The Volcanic Rocks of the Great Basin' (1884); 'The Volcanic Rocks of Salvador' (1886); 'Crystallization in the Igneous Rocks of Washoe'; 'Geology of the Yellowstone National Park' (1899).

Hague, George, Canadian financier: b. Rotherham, Yorkshire, Eng., 1825. In 1854 he went to Canada, where in 1856-76 he was connected with the Bank of Toronto. Subsequently he became general manager of the Merchants' Bank. He was also elected first president of the Canadian Bankers' Association and of the Montreal Good Government Association, and made generous gifts to various charities.

Hague, The (Holland), one of the chief towns, practically the capital of the kingdom, 33 miles southwest from Amsterdam, 16 miles northwest of Rotterdam, within 3 miles of the sea. It is the residence of the queen and of the foreign ambassadors, and the seat of the States-General of the Netherlands, and of the principal part of the central administration of the kingdom. Among the most important structures are the royal palace, in the Nordeinde, the palace of the Prince of Orange, the palace of Prince Frederick of the Netherlands; the Binnenhof, a large irregular building, founded in 1249, and containing the hall of assembly of the States-General, and various government offices, the provincial government-house, a large roomy edifice; the town-hall; the ministry of justice; the municipal museum, containing pictures and antiquities; the royal library, containing 500,000 volumes, besides valuable collections of medals and cameos; a cannon foundry, one of the largest and most conspicuous buildings in the town, colonial office, war office, the national monument, erected to commemorate the restoration in 1813 of Dutch independence. There are many other monuments to attract attention, particularly the equestrian statue of William I. of Orange, in front of the royal palace, and the figure of Shinoya, placed opposite the house in which he lived, etc. The royal collection of pictures, in the Prins Mauritshuis, embraces a picture gallery chiefly confined to Dutch masters. The parks, gardens, markets and suburbs of the city are famous for their beauty and interest. The special educational facilities of the city are excellent, and there are good public schools. There are also many learned societies in the city, among which may be mentioned The Hague Society for the Defense of the Christian Religion, the Witte Society, the Physics Society and the Netherland-India Institute. The Hague is not a manufacturing or commer-

cial city, its chief revenue being derived from the throngs of foreigners who visit the city and watering place on the coast.

The origin of The Hague may be traced to the building of a hunting seat here of the counts of Holland in 1250. It is the birth-place of William II., prince of Orange, and William III., prince of Orange and king of England. Here were held the International Peace Congresses in 1901-2 and 1907. Pop. about 210,000.

Hague Court, The, a permanent tribunal for international arbitration established as a result of The International Peace Conference, held in May, June, and July 1899 at The Hague, the governmental seat of the Netherlands.

The Hague International Peace Conference was one of the most important events which marked the close of the 19th century, and has been justly styled "the first great parliament of Man". The Conference assembled in response to a rescript issued by Czar Nicholas II. of Russia, 24 Aug. 1898, inviting to a conference all governments with representatives accredited to the Imperial Court. The Conference was to occupy itself with the great problem of universal peace, especially through the international diminution of armaments by land and sea, and the prevention of armed conflicts by pacific diplomatic procedure. The invitation was accepted by all the governments to whom it was tendered, and the first meeting for the Conference was fixed for 18 May 1899 at The Hague,—the capital of the Netherlands being selected, as stated by the Russian minister of foreign affairs, because "His Imperial Majesty considered it advisable that the Conference should not sit in the capital of one of the Great Powers where so many political interests centre that might impede the progress of a work in which all the countries are equally interested". The Conference was held at the celebrated Huis ten Bosch—House in the Wood,—the members assembling in the historically decorated Orange Hall. Each nation was represented by prominent diplomats, jurists, men of affairs, soldiers, and sailors, the representatives of the United States being Ambassador Andrew D. White, Minister Newel, General Crozier of the army, Captain Mahan of the navy, Seth Low, mayor of New York, and F. W. Hollis of the New York bar. The president of the Conference was Baron de Staal of the Russian delegation.

Three committees were formed to deal respectively with disarmament, regulations in warfare, and mediation and arbitration. The final act of the Conference, signed 29 July 1899, comprised three conventions or treaties embodying the results arrived at by the committees. The first and most important was the Convention for the Peaceful Adjustment of International Differences by the permanent institution of a Court of Arbitration in the midst of the independent powers, accessible to all. The second convention dealt with the laws and usages of war on land, and the third convention provided for the adaptation to naval warfare of the principles of the Geneva Convention of 1864. Regulations also prohibited the throwing of projectiles and explosives from balloons; the use of projectiles intended solely to diffuse deleterious and asphyxiating gases (this was not accepted by the United States and Great Britain); and the use of soft expansive bullets. The last two conventions embodied the wisest and most humane principles of military conduct resulting from a study and dis-

cussion of these matters during the half-century preceding, and which had their first codification in the "Instructions for Guidance of the Armies of the United States" issued at the beginning of the Civil War.

The Convention for the Peaceful Adjustment of International Differences, however, was the crowning work of the Conference, and was a source of much gratification to the advocates of international arbitration, as bringing to fruition a sentiment which for centuries had hoped for the establishment by the nations of the earth of some permanent form of congress or court, which should be vested with functions to insure the preservation of peace and to deliver the world from the strife and carnage with which it had been afflicted in all the past ages.

During the last decade of the 19th century peace advocates had been persistent in their advocacy of a permanent court of arbitration. In 1894, at its meeting in Holland, the Inter-parliamentary Union, a voluntary organization of members of the national legislative bodies of the nations, adopted a declaration in favor of a permanent court of arbitration; and in 1896 resolutions to the same effect were unanimously adopted in the United States at the annual Mohonk Conference on international arbitration, and by the New York State Bar Association, the latter presenting to the President of the United States a memorial setting forth a permanent tribunal as the essential feature of any general scheme of arbitration. The honor of presenting such a proposition in The Hague Conference fell to Lord Pauncefoot, chairman of the British delegation; Germany was antagonistic, but the sentiment was so strongly in its favor that the German delegates were induced to withdraw their objection, and provision was made for its consummation. The fourth division of the Convention in 47 articles provides for the creation of the Court, defines its jurisdiction and the principles which are to guide it, specifies the manner in which its members are chosen, the rules governing its procedure, its awards, and other necessary details. The Convention provides that each of the 26 signatory powers shall appoint for a term of six years as members of the Permanent Court not more than four persons "of recognized competence in questions of international law, enjoying the highest moral reputation." These persons constitute a Permanent Court of Arbitration, accessible at all times and acting in accordance with the prescribed rules of procedure; they do not, however, sit as a collective body, but when two or more nations have a case to submit to arbitration, they select by mutual agreement one, three, or five members, who will act as the tribunal to try the case. Thus it happens some members of the Court may never be called upon to discharge the functions of a judge. Also, although The Hague is designated as a place where the Court shall hold its sessions, another place may be designated by agreement of the litigant parties. Under the presidency of the Dutch minister of foreign affairs, the diplomatic agents of the signatory powers, in residence at The Hague, constitute a permanent council which serves as the office of the Permanent Court of Arbitration. The first cases adjudged by the Court were the Pious Fund Claim between Mexico and the United States in 1902, and the difficulties of Venezuela with the United States and various European nations in 1903.

For the erection of a Temple of Peace comprising a comprehensive library of international law and a courthouse which could be used as a meeting place for the Permanent Court of Arbitration, Andrew Carnegie on 25 April 1903 donated the sum of \$1,500,000 to be administered by the Government of the Netherlands as trustee for the other signatory powers of The Hague Convention of 29 July, 1899.

Decisions Rendered.—October 14, 1902—In the matter of the case of the Pious Fund of the Californias between the United States and Mexico.

February 22, 1904—Respecting the preferential claims of the creditor nations of Venezuela under the protocols of May 7, 1903.

May 22, 1905—In the difference between France, Germany and Great Britain on the one hand, and Japan on the other, respecting leases held in perpetuity.

May 22, 1909—In the matter of the Casablanca dispute between France and Germany.

August 8, 1909—In the matter of the dispute between Great Britain and France, respecting the right of certain Muscat Dhows to fly the French flag.

October 23, 1909—Respecting the maritime boundary between Norway and Sweden.

September 7, 1910—In the North Atlantic Fisheries case between the United States and Great Britain.

October 25, 1910—In the Orinoco steamship case between the United States and Venezuela.

February 24, 1911—In the "Savarkar" case between Great Britain and France.

Consult Foster, "Arbitration and The Hague Court" (1904); Holls, "The Peace Conference at The Hague" (1900); Hicks, "Equality of States and Hague Conferences" (1908); Scott, "Hague Peace Conferences" (1909); Higgins, "Hague Peace Conferences" (1909); Lynch, "Peace Problems" (1911).

Hahnemann, hä-nē-män, Samuel Christian Friedrich, German physician; founder of the homœopathic system: b. Meissen 10 April 1755; d. Paris 2 July 1843. In 1775 he went to Leipzig, where, against his father's will, he studied medicine, and found the means chiefly by the translation of English medical works. At a later period he went to Vienna, and after some years he returned and completed his studies at Erlangen. He afterward practised medicine at various places, but gave it up for a time, until, in 1789, by the translation of Cullen's 'Materia Medica,' he was led to adopt a new method of cure. His system was fully explained in his 'Organon der rationellen Heilkunde.' (1810). In 1820 the government prohibited him from dispensing medicines, and thereby, from his inability to have them prepared by druggists, obliged him to give up his practice. Duke Ferdinand of Anhalt-Köthen, however, gave him an asylum at Köthen, and conferred upon him the title of Hofrath. Here he remained till 1833, when he proceeded to Paris, where he hoped to find a wider sphere for his operations. The result equalled his expectations; and a royal decree issued in 1835 authorized him to practise Homœopathy. Among his works should be named 'Dictionary of Materia Medica,' his 'Essays on Poisoning by Arsenic, and on the Effects of Coffee,' and his treatise on 'Chronic Affections.'

Haidarabad, hī-da-ra-bād'. See HYDERABAD.

HAIL COLUMBIA—HAIR

Hail Columbia, a national song of the United States. The words written during a period of great political excitement in 1798, by Judge Joseph Hopkinson, were set to the melody of the 'President's March,' composed the same year in honor of President Washington, by Pfyfe, orchestral leader at the John Street Theatre, New York. The composition first sung at a theatrical benefit attained great popularity, and on account of its patriotic sentiments has become a representative national song.

Hail Mary, Ave Maria, or Angelical Salutation, a prayer consisting of three parts: the first, the words by which the angel addressed the Blessed Virgin (Luke 1. 24) with the word Mary after "Hail"; the second, the words by which Elizabeth addressed Mary (Luke 1. 42), to which has been added the word Jesus; the third, the words: "Holy Mary, Mother of God, pray for us sinners now and at the hour of our death—Amen." The name, "Angelical Salutation," comes from the first part of the prayer, which is the salutation of the angel. The first and second parts, taken from the Bible, were in use in their present form in early times; but the words of the third part were varied until the 16th century when the present form was approved and adopted by Pope Pius V. The prayer is in general use among Roman Catholics and is found in many Anglican books of devotion.

Hailes, Lord. See DALRYMPLE, SIR DAVID.

Haileybury College, England, an institution at Hailey, near Hertford, 20 miles north of London, founded by the East India Company in 1806, as a training school for admittance to the service of the company. It attained a high reputation, and numbered among its alumni, the most distinguished names connected with the Indian administration of the 19th century. After the Indian Mutiny of 1857-8, and the government reorganization of the Indian Civil Service, the college was closed for four years. It was reopened under a royal charter in 1862 as a public school, and while maintaining many of the traditions of its famous predecessor is no longer an Indian service training ground. Handsome modern buildings have been added to the old college quadrangle, built in 1809; the surrounding grounds cover nearly 100 acres. Consult: Lowell, 'Colonial Civil Service' (1900); Monier-Williams, 'Memorials of Old Haileybury College' (1894).

Hailmann, hăl'man, William Nicholas, American educator: b. Canton Glarus, Switzerland. 20 Oct. 1836. He studied at the medical college of Louisville, Ky., was director of the German-American Seminary at Detroit in 1878-83, in 1894-8 was national superintendent of Indian schools, and in 1898 became superintendent of instruction at Dayton, Ohio. Among his writings are: 'History of Pedagogy' (1870); 'The Application of Psychology to Teaching' (1887); 'Place and Development of Purpose in Education' (1899).

Hair, strictly speaking, the peculiar epidermal covering of the body in mammals, although by analogy the term is loosely applied elsewhere, as to the setæ of annelids, the slender modified spines of caterpillars, etc. Hair is present in every mammal, although the amount may be greatly reduced so that in certain whales

it occurs only in the foetal stage, in others is limited to two bristles on the lips. The structure is best understood by following the development. In the earliest stage (Fig. 1) there is merely a thickening of the Malpighian layer of the epidermis (see SKIN) at the points where the hair is to be found. This thickening increases in amount, and thus forms a solid plug (Fig. 2) which projects into the underlying

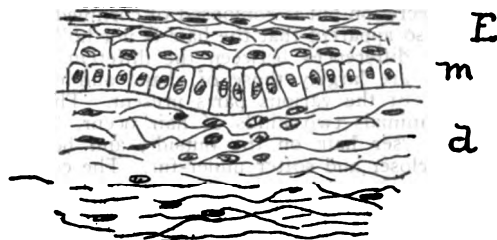


FIG. 1.—SECTION THROUGH THE EARLIEST STAGE OF HAIR FORMATION.

E, epidermis, showing in m, the Malpighian layer, the elongation of the cells; d, derma, with proliferation of cells to form the papilla shown in Fig. 2.

derma. At the same time the cells, which are scanty in most parts of the derma, become abundant beneath the ingrowing plug, and form the basis of the future papilla. Next a ring-shaped pit appears on the outer surface of the plug and gradually becomes deeper, cutting the epidermis into two parts, an outer root-sheath and an inner rod-like part, the hair itself, while

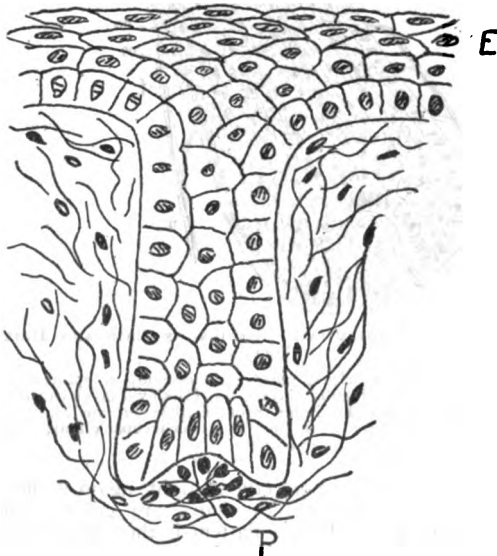


FIG. 2.—SECOND STAGE IN HAIR FORMATION.

The epidermis, E, has now formed a solid plug extending down into the derma; the papilla, P, has begun to form at the apex of the epidermal ingrowth.

the pit forms the follicle (see Fig. 3). The papilla grows into the base, bearing blood-vessels, while the Malpighian layer at this point forms the tissue from which the hair grows. In the hair itself several parts are recognized—a central pithy axis, the medulla; next, a layer of

HAIR-DRESSING

cells, the cortex, and outside this, forming the outer surface of the hair, the cuticle. Farther down in the follicle is the inner root-sheath, formed of two layers of cells known respectively by the names of the two anatomists, Henle and Huxley, who first described them. The Malpighian cells, at the base of the follicle, divide continually, and the new cells thus formed are pushed outward and are transformed into the hair. From this it will be seen that the hair is not a secretion but is composed of cornified cells. It is also apparent that the hair is not hollow.

The differences between the different kinds of hair are largely those of shape and of the amount of the various parts present. Thus in many animals two kinds of hair occur, longer and coarser hair on the outside, and beneath this a closer and softer under-fur. The coarser hairs may be enlarged into bristles, or still more enlarged to form spines, like those of the porcupines and hedgehogs. Again the hairs may become united to each other, the result being the formation of scales like those of the pangolins or horns like those of the rhinoceros. In some

render the hairs to a certain extent organs of touch, as in the whiskers (*vibrissæ*) of cats; and muscles for the erection of the hair (*erectorespile*). This erection may be to increase the warmth of the body by entangling a layer of air among the hairs, or it may have the purpose of protection against injury, either by terrifying some enemy or by affording a loose envelope around the body some distance from

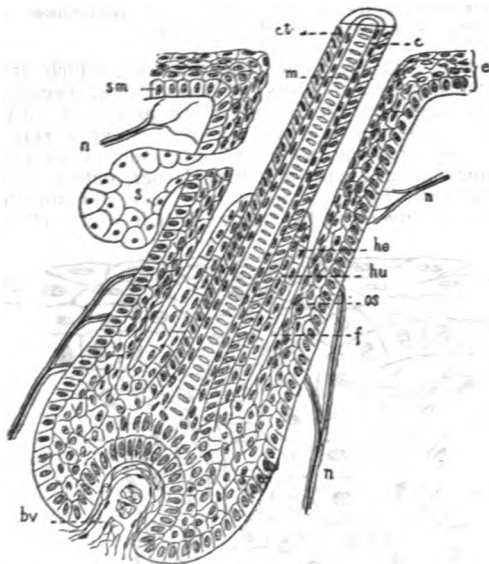


FIG. 3.—DIAGRAMMATIC SECTION OF HAIR AND HAIR FOLLICLE.

bv, blood vessel; c, cortex; ct, cuticle; e, epidermis; f, follicle; he, Henle's layer; hu, Huxley's layer (he and hu making up the inner root-sheath); m, medulla; n, nerve; os, outer root-sheath; s, sebaceous gland; sm, Malpighian layer of epidermis.

cases the hair is perfectly straight, again it may be curly. The straight hairs are circular in section, the curly are flattened, the amount of curl being proportional to the amount of flattening. Certain hairs (wool of sheep, etc.) have the property of felting. This depends upon the scale-like projections of the cells of the cuticular layer. The color of the hair is due to the presence of pigments belonging to the group of melanins.

Several accessory structures (Fig. 5) are connected with the hair: sebaceous glands which empty an oily substance into the follicle to keep the hair in a moist, soft condition; nerves which are distributed to the wall of the follicle and thus

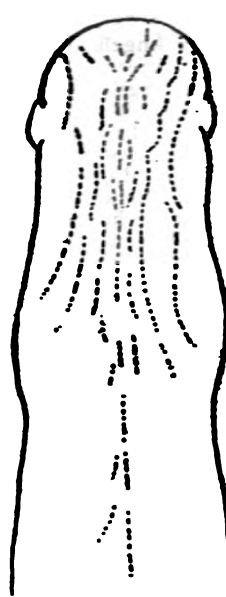


FIG. 4.—Hair tracts on the back of an embryo cat (after MAURER).



FIG. 5.—A HAIR.

Vertical section of skin, showing hair-follicle and related parts: a, epidermis; b, hair; c, hair-bulb; d, sebaceous glands; e, fat-cells.

the flesh. Usually the hair is shed (molted) at regular intervals, but there are exceptions, as in the mane and tail of horses, as well as in the case of man. The hair is not scattered irregularly over the body but occurs with more or less regular arrangement. In the early embryos it is not uncommon to find it distributed in regular lines (Fig. 4). Later the lines become broken up into groups of hairs, the arrangement being characteristic of the species, but without any broad morphological significance. It should be noted that although hair and pin-feathers closely resemble each other in general appearance they are very distinct structures, hair originating in a thickening of the epidermis, while feathers (q.v.) like scales are dermal in origin. Most of the literature relating to the hair is in German. Consult the writings of Maurer, Meigler, Weber, and Poulton, 'Quarterly Journal of Microscopical Science,' Vol. XXXVI. (1894).

J. S. KINGSLEY,
Professor of Zoology, Tufts College.

Hair-dressing. As the hair is the greatest ornament of the human body, the arrangement of it has always been one of the most important duties of the toilet. The ancient Hebrews esteemed fine hair a great beauty, as several passages of Scripture show. The Hebrew women plaited their hair, confined it with gold and silver pins, and adorned it with precious stones. Herodotus informs us that the ancient Egyptians

HAIR MANUFACTURES—HAIRLESS DOGS

let the hair of the head and beard grow only when they were in mourning. Even in the case of young children they were wont to shave the head, leaving only a few locks on the front, sides, and back. The women, however, wore their natural hair long and plaited, often reaching down in the form of strings to the bottom of the shoulder-blades. A practice the very opposite seems to have prevailed among the ancient Assyrians, as regards men at least. In the Assyrian sculptures the hair always appears long, combed closely down upon the head, and shedding itself in a mass of curls on the shoulders. The beard was also allowed to grow to its full length. To the Greeks the hair was an object of great importance, and they devoted much time to it. Homer regularly applies to the Greeks an epithet denoting that they had ample flowing locks.

The Athenians curled their hair, and fastened it up with small golden ornaments shaped like grasshoppers, in token of their being "sons of the earth." Gold, pearls, precious stones, flowers, and ribbons were employed to ornament the tresses, and nets were also worn. False hair seems to have been latterly used, and in great quantities, both curled and frizzled. Married women were distinguished from the unmarried by the manner in which the hair was parted in front. The Romans generally wore no covering on their heads except at sacred rites, games, festivals, and in war. Women in later times wore great quantities of false hair, and dyeing the hair was common. They were particularly addicted to frizzling and curling their hair, raising it into stories of curls, some of great height. Long hairpins were used to fix the curls. Arranging the hair was a matter of great importance. Slaves frizzled and adjusted it, and a number of females learned in the art of the coiffeur superintended the process, while the fair dame herself watched the growing edifice of curls, gold, precious stones, crowns of flowers, in a mirror of polished steel, brass, tin, or silver.

On the introduction of Christianity the apostles preached against the prevailing fashion of dressing the hair. St. Paul regarded it as a shame for a man to have long hair, though the reverse for a woman. It then became common for men to cut the hair short; hence the clergy soon wore the hair quite short, and afterward even shaved their heads in part. In the time of Francis I., king of France, long hair was worn at court; but the king, proud of his wound on the head, himself wore short hair, in the Italian and Swiss fashion, which soon became general. In the reign of Louis XIII. the fashion of wearing long hair was revived, and as it became desirable to have the hair curling, the wigs were also restored.

Among the Anglo-Saxon women the custom prevailed of parting, curling, and turning the hair over the back. Anglo-Saxon men wore their hair long at the time of the Norman invasion, while the conquerors adopted the singular fashion of shaving the back of the head. Under Elizabeth, false hair was greatly worn, padded with cushions, under-propped, with forks, wires, etc., and adorned with gold, pearls, and precious stones. It is well known that the gallants of Charles I.'s time wore their hair in long flowing locks, while the closely-cropped hair of the Puritans brought the name of Roundheads down

upon them. In the Queen Anne era, while the ladies wore their hair long, they generally tied it in a knot, and almost completely covered it up by extravagant head-dresses of wire and paste-board, or feathers and ribbons. At that time, and for long after, the coiffure of a lady was such a serious affair, and the hair-dressers were so fully employed, that fair wearers were often compelled to have that part of their toilet done two days before a ball, and pass the night on a chair for fear of disturbing the elaborate arrangement. This was the period of the prevalence of whitening the head with hair-powder, a preparation of pulverized starch and perfume. The custom of wearing it was introduced from France into England in the reign of Charles II. To make the powder hold, the hair was usually greased with pomade. In 1795 a tax was put upon the use of hair-powder in Great Britain, and at one time yielded \$100,000 per annum, but the result was that hair-powder fell out of general use, and the French Revolution, which overturned so many antiquated customs, further contributed to throw it into disfavor. The chignon was introduced and had its day of popular favor in the 19th century, bringing back the fashion of false hair and padding to a greater or less extent. With respect to men's hair, short cutting is now universal, long hair being considered as a sign of slovenliness or eccentricity.

Hair Manufactures. the industries by which the hair of animals is employed in the production of commercial articles of ornament or utility. The strongest and most durable of hair-cloth is woven from the tails of horses. The horsehair from the mane is twisted into ropes and after being boiled and then dried in an oven is untwisted and in a half-matted condition employed for stuffing beds and cushions. The hair of cows is employed as a binder for plaster; in Europe it is sometimes woven into carpets, or hose. The Chinese use pig's hair for the same purposes. The stiff hair, or bristles from the ridge of the hog's back, are made into brushes, for the hair, teeth, or nails; as well as into brooms, and the larger painting and whitewashing brushes. Human hair is used for wigs, toupees and frisettes. See Wig.

Hair Pencil, in painting, a fine brush made of the hairs of the camel, sable, badger, squirrel, marten, raccoon, goat, etc. The various sizes require the quills of the crow, pigeon, goose, turkey, or swan. Hair pencils are used by artists in water colors, and by house and sign painters in fine work.

Hair-tail. See SCABBARD-FISH.

Hair-worm. See EELWORM.

Hairless Dogs. Several races of domestic dogs are bred in the warmer parts of the world, whose skins are nearly hairless. In China and Farther India a large dog of this description, called polygar, is used in hunting. Central Africa has a breed resembling a small black greyhound. A hairless dog is found mummified in prehistoric Peruvian tombs, and others were formerly prevalent in the West Indies, or is still known in Mexico. These have been cultivated by fanciers in the United States, and constitute a recognized show class. They are small and terrier-like, brownish or bluish-black, wrinkled,

and have only a few straggling hairs on the body, with sometimes a tuft on the head.

Haiti, Hayti, or Santo Domingo, the second largest island of the West Indies, lying between Cuba and Porto Rico, the principal adjacent islands being La Gonave, at the entrance of Port-au-Prince, Tortuga Island, before Port de Paix, and Vache Island, before Cayes. The whole island is about 638 kilometres long with a surface of 75,074 square kilometres. It comprises two republics: the Republic of Haiti in the west and the Dominican Republic (q.v.) in the east, with a total population of 1,700,000. The land is very fertile, being irrigated by 47 rivers; 14 mountain chains are spread over the island. The mines are still to be worked and there is a large field for investment. Haiti is healthful. From June to September it is hot in the lowlands; but regular land and sea breezes moderate the temperature. In the mountains it is always cool. There is a dry and a wet season. There are no poisonous snakes or insects. The sanitary condition is excellent.

When, on 6 Dec. 1492, Columbus discovered Haiti, the island was divided into five states or "cacicats." The inhabitants, called Indians, had an easy life and were ruled by chiefs whose title was "cacics." The natives could not stand the hard work imposed on them by the Spaniards; they died rapidly. Then began the import from Africa of the black slaves. The Spaniards enjoyed alone their new possession until 1630, when the French adventurers known as "buccaneers" and "freebooters," after occupying Tortuga Island, undertook the conquest of what became St. Domingue.

From the intercourse between white and black, resulted in St. Domingue an intermediary class, the mulattoes. Most of the latter, on account of their relationship, were not slaves; and their black mothers, their relatives, and other slaves who could own enough money to redeem themselves, little by little obtained their freedom. These free colored people were not allowed any political rights. They at first did not resent it. They endeavored to become land-owners.

When the French Revolution broke out in 1789 these free men or "affranchis," who by that time had accumulated wealth, asked for equality of political rights. The Assemblée Nationale granted them those rights. But the French landlords or "colons" were not at all pleased to have the colored people for their fellow citizens. A hard struggle began. The "colons" called the English to their rescue.

At the end of the year 1793, the English took possession of a part of the island. St. Domingue was considered lost to France, being occupied partly by the Spaniards, partly by the English, when Toussaint Louverture (q.v.) espoused the cause of France. This extraordinary man, who, up to 40 years of age, was a slave, revealed himself a great general and a first-class statesman. He succeeded in ridding the country of the Spaniards and in expelling the English, who, after an occupation of about five years, were compelled to abandon their prey. The French government rewarded him by appointing him major-general and governor of the island. Later on, Napoleon I. thought that Toussaint Louverture was too powerful. In 1801 he appointed his brother-in-law, Gen. Leclerc, governor of St. Domingue, and sent a formidable

army to reduce the authority of Louverture. Toussaint Louverture, after a few skirmishes, surrendered and retired on one of his properties. Nevertheless, Gen. Leclerc caused him to be arrested and deported to France in June 1802; to that end the French general resorted to treachery.

The colored people took up arms against the French domination in September 1802 under the leadership of Gen. Dessalines. The fight was very severe. And at the end of the year 1803, Rochambeau, who, at the death of Gen. Leclerc, was in command of the French army, hard pressed in the city of Cape Haiti by the black troops, was compelled to capitulate. And on 1 Jan. 1804 Haiti proclaimed its independence, with Gen. Dessalines as its first ruler. Slavery was abolished. Haiti was then the first country to rid humanity of such a sad practice.

In 1822 the Spanish part came under the administration of Haiti; and the whole island was ruled by one government. But in 1844 the Spanish part seceded and established an independent government, known to-day as the Dominican Republic.

The Republic of Haiti is administered by a president, elected for seven years, by the House of Representatives and the Senate assembled in "Assemblée Nationale." The president is assisted by six ministers or secretaries of state. The House of Representatives is elected by the people for three years, and the Senate is elected by the House of Representatives for six years; but every two years the third part of the Senate is renewed.

The judiciary organization consists of a supreme court (Tribunal de Cassation) of civil, criminal, correctional courts, and of justices of the peace.

Education is compulsory and gratuitous. The primary as well as the high schools are freely open to all. Haiti devotes now a sixth of its revenues to education.

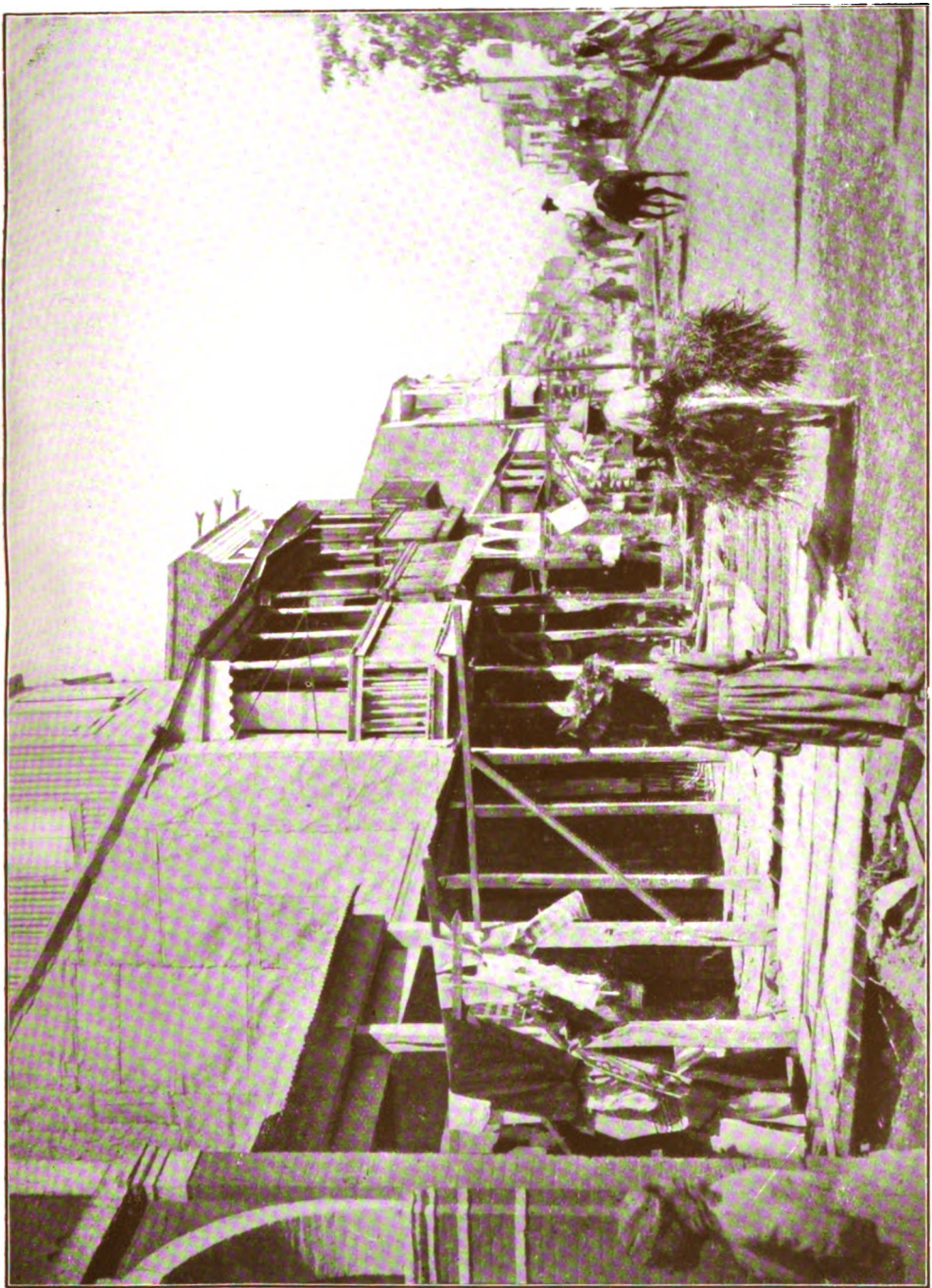
French is the language of Haiti, though the country people speak a patois called "creole."

The religion of the people is Roman Catholic. There are an archbishop, three bishops, and in every commune at least a priest. The pope entertains a diplomatic representative, a legate, at Port-au-Prince, and Haiti has a minister accredited to the Holy See. Freedom of conscience is, however, guaranteed; and all cults are protected. Haitian citizens only can own real estate. Any foreigner may easily be naturalized.

Haiti produces coffee, cocoa, logwood, mahogany, and cotton; tortoise-shells, all kind of cabinet wood, hides, honey, bees-wax, etc., are also exported; for home consumption, they make sugar, rum, soap, straw hats, pottery, matches, artificial ice, etc. There is a railroad from Cape Haiti to Grande Rivière and another one from Port-au-Prince to "L'Etang." These railroads are managed by Haitian companies; so are the inland telegraph and telephone lines. The area of the Republic is estimated at 26,000 square kilometres and the population about 1,295,000.

J. N. LÉGER,
Envoyé Extraordinaire et Ministre Plénipotentiaire d'Haiti aux Etats-Unis.

Hake, Alfred Egmont, English journalist and author. He is a son of Thomas Gordon Hake (q.v.) and cousin of General C. E. Gor-



MAIN STREET, PORT-AU-PRINCE, HAITI.

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don (q.v.), whose life he has written in 'The Story of Chinese Gordon' (1883). Other works by him are: 'Paris Originals' (1878); 'Flattering Tales' (1882); 'The Unemployed Problem Solved' (1883); 'Events in the Taping Rebellion' (1891); 'Suffering London' (1892); 'Gordon in China and the Soudan' (1896); 'Irish Finance' (1897).

Hake, Thomas Gordon, English poet and physician: b. Leeds 1809; d. London 11 Jan. 1895. He took his medical degree at Glasgow University in 1831, and practised his profession in East Anglia, later becoming the physician and friend of Dante Gabriel Rossetti. His poetry is thoroughly original, but very subtly philosophical. His works include: 'Poetic Lucubrations' (1828); 'Vates: A Prose Epic' (1839); 'Madeline with Other Poems and Parables' (1871); 'New Symbols' (1875); 'Maiden Ecstasy,' verse (1880); 'The Serpent Play, a Divine Pastoral' (1883); 'Memoirs of Eighty Years' (1892).

Hakes, Fishes of the family *Gadida* and chiefly of the genera *Phycis* and *Merluccius*, distinguishable from the cod and haddock by having only two dorsal fins. *Phycis* has a chin barbel, and filamentous ventral fins, both of which are lacking in *Merluccius*. The squirrel-hake (*Phycis chuss*) and white hake (*P. tenuis*), both also called ling or codling, are common bottom fish on our Atlantic coast from Virginia northward. The silver hake or whiting (*Merluccius bilinearis*) has a similar range, but is less common in shallow waters and leads a roving life in search of herrings and other smaller fishes. Various other species occur in the North Atlantic and Pacific Oceans. The hake fishery is of considerable extent, and the product is salted and sold chiefly as boneless cod. The dried air-bladders are utilized in the manufacture of isinglass.

Hakim, ha-kēm', a Turkish word, signifying lord and frequently in the Koran applied to Allah, God, as in the Greek and English versions of the Jewish Scriptures the word Lord is used for Jehovah. It is now-a-days especially given as a title of honor to the imperial physician of the Sultan, who is Hakim bashi, that is to say, the chief of the physicians, always a Turk; whilst the physicians in the seraglio under him are western Europeans, Greeks and Jews.

Hakluyt, hāk'loot, **Richard**, English geographer: b. about 1553; d. London 23 Nov. 1616. He entered Christ Church College, Oxford, in 1570, and became so eminent for his acquaintance with cosmography that he was appointed public lecturer on that science. In 1582 he published a small collection of voyages and discoveries, forming the basis of a subsequent work on a larger scale. In 1584-88 he was in Paris as chaplain to Sir Edward Stafford. On his return he published (in 1589) his famous collection of 'The Principal Navigations, Voyages, and Discoveries of the English Nation, made by Sea, or over Land, within the Compass of these 1500 Years.' The first volume of a new edition of his great work was published in 1598, the second and third in 1599 and 1600. In 1602 he became prebendary, and in 1603 archdeacon, of Westminster, and next year he was appointed a chaplain of the Savoy. He was interred in

Westminster Abbey. He published several other geographical works, among them 'Virginia Richly Valued, etc.' (1609), a translation from the Portuguese. An edition of his chief work appeared in 16 vols. 1885-90. The manuscript papers of Hakluyt were used by Purchas in his 'Pilgrims.'

Hakluyt Society, of Great Britain, organized in December 1846, for the purpose of printing and distributing among its members rare volumes on voyages and travels, and geographical records. Between 1847 and 1900 fully 100 volumes were issued under the editorial supervision of eminent authorities. Among these publications were: 'Select Letters of Columbus' (1849); Raleigh, 'Guiana' (1848); and 'Danish Arctic Expedition' (1897).

Halbig, Johann, yō'hän hāl'bīg, German sculptor: b. Donnersdorf, Lower Franconia, 13 July 1814; d. Munich 29 Aug. 1882. He studied at the Munich Academy, and elsewhere, finally establishing himself at Munich, where he became a professor in the Polytechnic School in 1845. His most important work is the quadriga with four colossal lions for the triumphal gateway, Munich. He also executed the Platen memorial at Ansbach, the bronze statue of Fraunhofer at Munich, the 'Emancipation' group in New York, the 'Crucifixion' group for Oberammergau, and numerous busts.

Haldeman, hāl'dē-man, **Samuel Stehman**, American naturalist: b. Locust Grove, Pa., 12 Aug. 1812; d. Chickies, Pa., 10 Sept. 1880. He was educated at Dickinson College, Pa., was professor of natural sciences at the University of Pennsylvania in 1851-5; and of comparative philology there 1869-80. He published 'Fresh-Water Univalve Mollusca of the United States' (1840); 'Zoological Contributions' (1842-3); 'Elements of Latin Pronunciation' (1851); 'Affixes in Their Origin and Application' (1865); 'Pennsylvania Dutch' (1872); 'Outlines of Etymology' (1877); 'Analytic Orthography' (1858); etc.

Hal'dimand, Sir **Frederick**, Swiss soldier in the English service: b. Canton of Neuchâtel, Switzerland, October 1718; d. Yverdon, Switzerland, 5 June 1791. He served in the army of Sardinia and in that of Prussia under Frederick the Great, later became a member of the Swiss guard at The Hague, and was there stationed when with Henry Bouquet (q.v.) he enlisted in 1756 in the British army for service in America. He organized, largely from Pennsylvania, a regiment composed of Swiss, Germans, and others and known as the 'Royal Americans,' and became its commander. In 1759 he won distinction by his successful defense of Oswego against the attack of 4,000 French and Indians, in 1767-73 commanded the garrison at Pensacola, Fla., and assisted Gage in the siege of Boston. From 1778 to 1784 he was governor of Canada, severely repressed Canadian sympathy with the Revolution, and offered an asylum to royalist refugees. His valuable official correspondence is in the possession of the British Museum. Upon his return to England actions for false imprisonment were successfully brought against him.

Hale, Charles Reuben, American Protestant Episcopal bishop: b. Lewiston, Pa., 14 March 1837; d. Cairo, Ill., 25 Dec. 1900. He

was graduated at the University of Pennsylvania in 1858; entered the Episcopal ministry and in 1892 was made assistant bishop of Springfield, Ill., with the title of Bishop of Cairo. He was an authority upon matters pertaining to the Greek Church and his writings, all of a very scholarly cast, mainly relate to the history, liturgies and customs of that communion.

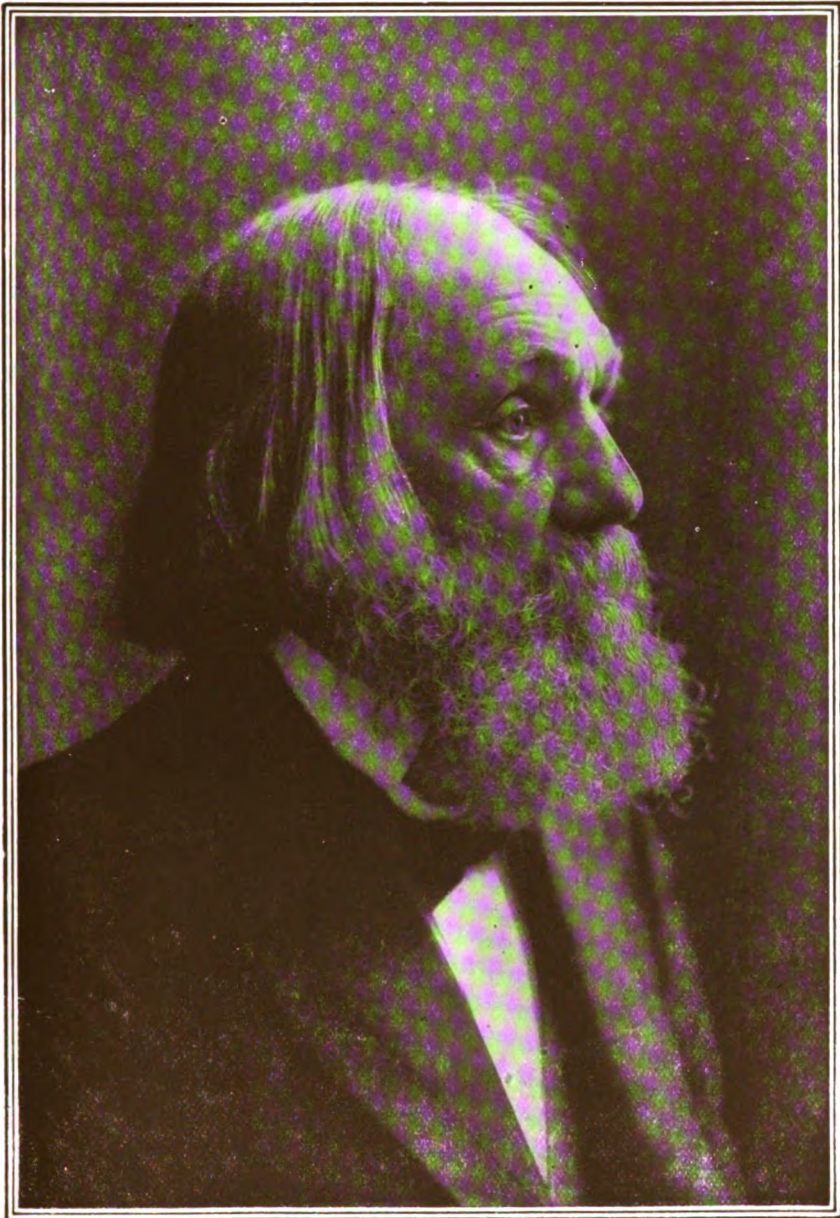
Hale, Edward Everett, American Unitarian clergyman and author: b. Boston, Mass., 3 April 1822; d. 10 June 1909. His father was Nathan Hale (q.v.), the first editor of the Boston *Daily Advertiser*, and the son was educated at the Boston Latin School and Harvard College. Later he studied theology and was pastor of the Church of the Unity, Worcester, Mass., 1846-56. He then became pastor of the South Congregational Society in Boston, a Unitarian Church, and has been its pastor emeritus from 1901. In the Unitarian body he has long been one of its foremost men, and of a radical rather than a conservative type, while yet strongly loyal to the Unitarian faith. As a preacher he has always been popular, and his talents for organization have borne fruit in such humanitarian societies as the Harry Wadsworth Clubs, King's Daughters, Look Up Legions, and others. For several years he edited 'Old and New,' a magazine afterward merged in 'Scribner's Monthly,' and has edited 'Lend a Hand,' a journal of organized charity, since 1886. Since his retirement from active pastoral work he has been active in various denominational and other religious and social enterprises, and still continues to preach and lecture at frequent intervals. His 80th birthday was celebrated by a gathering in Symphony Hall, Boston, composed of representative persons from all denominations in his native city, as well as of civic and state officials, assembled to testify to the regard in which he was held, irrespective of creed or race. To Americans in general, however, he is best known as an author, and in spite of his countless clerical labors he has been one of the most voluminous of American writers. Much of his work is from necessity ephemeral in its nature, but when he has consciously wrought with an artistic end in view his level of attainment has been high. His short story, 'The Man Without a Country,' has long been accounted an American classic, and even more skilful in construction and perfect in finish, 'My Double and How he Undid Me,' and 'In His Name' have been almost equally popular. In extravaganzas like 'The Brick Moon,' such an absolute air of verisimilitude is preserved that the absurdest conceptions of the tale appear more than half credible. 'The Man Without a Country' was indeed accepted as a record of fact by many readers on its first appearance in 1863, although the theme is in its conception most improbable, and its author was obliged to state at a later date that it had no foundation in fact. The list of his published works is a long one, including nearly 70 titles and besides those already named may be cited 'Margaret Percival in America' (1850); 'Elements of Christian Doctrine' (1860); 'If, Yes, and Perhaps' (1868); 'Sybaris and Other Homes' (1869); 'The Ingham Papers' (1869); 'His Level Best and Other Stories' (1872); 'Philip Nolan's Friends' (1876); 'The Fortunes of

Rachel' (1884); 'Boys' Heroes' (1886); 'Life of George Washington Studied Anew' (1887); 'They Saw a Great Light' (1889); 'The Story of Christopher Columbus' (1891); 'The Story of Massachusetts' (1891); 'The New Harry and Lucy' (1892); 'East and West or the New Ohio' (1892); 'A New England Boyhood' (1893); 'Fifty Years' Poems' (1893); 'If Jesus Came to Boston' (1894); 'Susan's Escort' (1895); 'Historic Boston' (1898); 'Lowell and His Friends' (1899); 'Memories of a Hundred Years' (1900). With his sister Susan Hale (q.v.) he has written a series of travel books entitled 'Family Flights through France, Germany, etc.,' and he has also edited numerous volumes from 'The Rosary' (1848) to 'Unpublished Essays of Emerson' (1895).

Hale, Eugene, American politician: b. Turner, Oxford County, Me., 9 June 1836. After study of law he was admitted to the bar in 1857, began practice at Ellsworth, Me., and was a member of the Maine legislature in 1867, 1868 and 1880. In 1868 he was elected representative to Congress, and in that capacity served until 1878, acting on the committee on appropriations, and during his last term being chairman of the Republican congressional committee. In 1868, 1876 and 1880 he was a delegate to the Republican national conventions of those years, in 1874 was offered the post of postmaster-general and in 1877 that of secretary of the navy, but declined both. He was a member of Grant's commission appointed for canvass of the Louisiana presidential vote in 1876. He succeeded Hannibal Hamlin in the United States Senate in 1881, and was re-elected in 1887, 1893, 1899 and 1905. In the Senate he became known as a Republican leader, interesting as a speaker and skilful in matters of legislative routine.

Hale, George Ellery, American astronomer: b. Chicago 29 June 1868. He was graduated from the Massachusetts Institute of Technology in 1890, studied also in the Harvard observatory and at Berlin, was professor of astrophysics at Beloit College in 1891-3, lecturer in astrophysics in Northwestern University, 1891-3, associate professor of astrophysics in the University of Chicago 1892-7; director of the Yerkes Observatory (Williams Bay, Wis.) of the university 1895-1905, professor of astrophysics 1897-1905, and in 1905 director of the Solar observatory of Carnegie Institution at Mt. Wilson, Cal. He edited the 'Astrophysical Journal' from 1895, and published papers on astronomical subjects.

Hale, Horatio, American ethnologist: b. Newport, N. H., 3 May 1817; d. Clinton, Ontario, 29 Dec. 1896. He was a son of Sarah J. Hale (q.v.). He was graduated from Harvard in 1837 and the next year was appointed philologist to the government exploring expedition under Captain Wilkes, and was thus enabled to study the languages of the Pacific Islands, North and South America, Australia, and Africa. The results of his observations were published in 'Ethnography and Philology' (1846). He then studied law, was admitted to the Chicago bar, and removing to Canada in 1855 practised law at Clinton. His other works are: 'Indian Migrations as Evidenced by Language' (1883); 'The Iroquois Book of Rites' (1883); 'A Report on Blackfoot Tribes' (1885). He was classed among the foremost philologists of his



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EDWARD EVERETT HALE.

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time and was a member of learned societies at home and abroad.

Hale, Irving, American soldier and electrician: b. North Bloomfield, N. Y., 28 Aug. 1861. He was graduated from the United States Military Academy in 1884, was assigned to the engineer corps, was instructor in engineering at the Military Academy in 1888-9, and in 1890 resigned from the army. He became manager of the General Electric Company for the district comprising Utah, Wyoming, Colorado, and New Mexico, with headquarters at Denver; upon the outbreak of the Spanish-American war was appointed colonel of the 1st regiment of Colorado volunteers, was promoted brigadier-general for distinguished service in the Philippines, and later brevetted major-general. In 1899 he was honorably discharged from the volunteer service. His writings include papers on electrical subjects in scientific and engineering journals and in the proceedings of the Colorado Scientific society.

Hale, John Parker, American legislator and diplomat: b. Rochester, N. H., 31 March 1806; d. Dover, N. H., 19 Nov. 1873. After graduation from Bowdoin in 1827 and study of the law at Rochester and Dover, he was admitted to the bar in 1830, in 1832 was elected a Democratic representative in the State legislature, and in 1834-41 was United States district attorney. In 1842 he was elected to Congress, where, though remaining a Democrat, he stoutly opposed the "gag-rule" which sought the exclusion of anti-slavery petitions. He was renominated; but previous to the election the annexation of Texas was made a plank of the Democratic platform, and the State legislature of New Hampshire directed its congressmen and senators to support the measure. Hale in a public statement refused to do this and the Democratic State Convention was then reassembled and his name stricken from the ticket. Hale ran as an independent Democrat, but no candidate received a majority. In 1846, after a spirited canvass known as the "Hale storm of 1845," he was elected to the lower house of the legislature, and became its speaker. In 1847 he was elected to the United States Senate, where he was the first, and, until joined by Salmon P. Chase in 1849, the only avowed anti-slavery member. He was an orator of fine abilities, and besides opposing the slave system, secured laws abolishing flogging and grog-ration in the navy. He was nominated for president by the Free-Soil Democrats in 1852, and received 157,685 votes. In 1855 he was elected to the Senate for the four years of the unexpired term of C. G. Atherton, deceased, and in 1858 for a full term. During the Civil War he supported the Lincoln administration. He was United States minister to Spain in 1865-9.

Hale, Lucretia Peabody, American author, sister of E. E. Hale (q.v.): b. Boston, Mass., 2 Sept. 1820; d. there 12 June 1900. She was very popular as a writer for young people, and in addition to 'The Lord's Supper and Its Observance' (1866); 'The Service of Sorrow' (1867); 'The Wolf at the Door' in the 'No Name Series' (1877), she published for young readers 'The Peterkin Papers' (1882), and 'The Last of the Peterkins' (1886). She also wrote 'The New Harry and Lucy' (with E. E. Hale). She

will be longest remembered as the creator of the Peterkin Family, who have become widely recognized types of character.

Hale, Sir Matthew, English jurist: b. Alderley, Gloucestershire, 1 Nov. 1609; d. there 25 Dec. 1676. He was educated at Oxford and Lincoln's Inn, and is said to have studied 16 hours daily, extending his researches to natural philosophy, mathematics, history, and divinity, as well as the sciences more immediately connected with his profession. He was called to the bar before the commencement of the civil war; and in the conflict of parties which took place his moderation, accompanied as it was by personal integrity and skill in his profession, secured him the esteem of both royalists and parliamentarians in his own time. In 1654 he became a judge of the Common-bench (the former King's-bench), in which station he displayed firmness of principle sufficient to give offense to the Protector. He was a member of the parliament which restored Charles II., and one of the members most active in passing the Act of Indemnity. In 1660 he was knighted, and made chief baron of the Court of Exchequer. He was the last English judge who sanctioned the conviction of culprits for witchcraft. He was raised to the chief-justiceship of the King's-bench in 1671. After his death appeared his 'History of the Pleas of the Crown'; 'Jurisdiction of the Lords' House'; and 'The History of the Common Law of England.' He also wrote several works on scientific and religious subjects.

Hale, Nathan, American revolutionary officer: b. Coventry, Conn., 6 June 1755; d. New York 22 Sept. 1776. He was graduated at Yale in 1773, and engaged as a teacher, first at East Haddam, and afterward at New London. His parents intended him for the ministry; but on the Lexington alarm in 1775 he wrote to his father, in a Connecticut regiment, saying "that a sense of duty urged him to sacrifice everything for his country," and soon after entered the army as lieutenant (1775) and in a few months was promoted to be captain (1776). While with the troops near Boston he was vigilant and faithful in every point of duty; and according to a tradition of doubtful authenticity, in September 1776, when in New York, he, with an associate, planned and effected the capture of a British sloop laden with provisions, taking her at midnight from under the guns of the man-of-war Asia, and distributing her prize goods to the American soldiers. After the retreat of the army from Long Island, when it was all-important to understand the plans of the enemy, Washington applied for a discreet and practised officer to enter the enemy's lines and procure intelligence, and Hale volunteered for the service. He passed in the disguise of a Dutch schoolmaster to the British camp and made full drawings and memoranda of all the desired information, but on his return was apprehended and taken before Howe, by whom he was ordered to execution the next morning. He was denied a Bible and the aid of a clergyman; and was hanged, saying with his last breath: "I only regret that I have but one life to lose for my country." A statue of Hale is in City Hall Park, New York. Consult the 'Life' by Johnston (1901); Holloway, 'Nathan Hale, the Martyr Hero' (1899).

HALE—HALÉVY

Hale, Nathan, American journalist: b. West Hampton, Mass., 16 Aug. 1784; d. Brookline, Mass., 9 Feb. 1863. He was a nephew of the patriot Nathan Hale (q.v.) and father of E. E. Hale (q.v.). He was graduated from Williams College in 1804, and after studying law was admitted to the Boston bar in 1810, in 1811-4 was editor of the Boston 'Weekly Messenger,' and in 1814 purchased and became editor of the *Advertiser*, established in 1813 and the first New England daily. At first Federalist in politics, the *Advertiser* became successively Whig and Republican and was at all times very influential. In 1820 it opposed the Missouri bill, in 1854 the Kansas-Nebraska bill, and it was the first newspaper to advocate the settlement of Kansas by 'Free-Soil' colonists. Hale was a founder of the 'North American Review' (1815), served at various times in both houses of the Massachusetts legislature, published a series of stereotyped maps after a method invented by himself (1830), and wrote pamphlets on topics of internal improvement.

Hale, Philip, American music critic: b. Norwich, Vt., 5 March 1854. Graduated from Yale in 1876, he was admitted to the bar in Albany (1880), studied music under Dudley Buck and later in Europe with Haupt, Bargiel, and Guilmant (1885-7), and was organist successively of Saint Peter's, Albany (1879-82), Saint John's, Troy (1887-9), and the First Unitarian Society of Roxbury, Mass. (1889). In 1889-97 he contributed music criticism to the Boston press, from 1891 was critic of the *Journal*, in 1897 became editor of the 'Musical Record,' and in 1901 of the 'Musical World.' He is known as one of the most discriminating and interesting of American writers on musical subjects.

Hale, Salma, American politician: b. Alstead, Cheshire County, N. H., 7 March 1787; d. Somerville, Mass., 19 Nov. 1866. He was early apprenticed to a printer of Walpole, N. H., in 1805 became editor of the 'Political Observer,' a Republican journal of Walpole, held various local offices, and in 1828 and 1844 was a member of the New Hampshire house of representatives, and in 1824 and 1845 of the State senate. In 1845 he was appointed secretary of the commission for the determination of the northeastern boundary line of the United States. He was elected to Congress in 1816 as a Republican (Democratic) representative, but declined a re-election. His 'History of the United States' (1821) won a prize of \$400 and a gold medal, offered by the American Academy of Belles-Lettres, and appeared in many subsequent editions. He published also 'The Administration of J. Q. Adams' (1826); and 'Annals of the Town of Keene' (1826).

Hale, Sarah Josepha Buell, American author and editor: b. Newport, N. H., 24 Oct. 1788; d. Philadelphia 30 April 1879. Her husband dying in 1822 leaving her with five small children, she supported her family by literary work. She was editor of the Boston 'Ladies' Magazine' 1828-37, and when in 1837 this was consolidated with 'Godey's Lady's Book,' published in Philadelphia, she became editor of the latter also, continuing in the position for forty years. She retired from literary life in 1877. Her efforts in behalf of the Bunker Hill Monu-

ment fund, her interest in seamen, in foreign missions, and in the higher education of women, were untiring and successful. For many years she advocated the keeping of Thanksgiving Day as a national festival, as it has been observed since 1864, when President Lincoln adopted her suggestion. Her most enduring publication is 'Woman's Record: or Sketches of All Distinguished Women' (New York 1874).

Hale, Susan, American author and watercolorist: b. Boston 5 Dec. 1833. She has published 'Life and Letters of Thomas Gold Appleton' (q.v.) (1885), and with her brother, E. E. Hale (q.v.) has written the popular 'Family Flight' series of travel books for young people.

Hale, William Bayard, American writer: b. Richmond, Ind., 6 April 1869. He was graduated from Harvard and the Episcopal Theological School (Cambridge, Mass.), and was rector at Middleborough, Mass., 1892-9, and subsequently at Ardmore, Pa., retiring from the ministry in 1901. He has published 'The Making of the American Constitution'; 'The Eternal Teacher' (1895); 'The New Obedience' (1898); 'Phillips Brooks'; etc.

Hale, William Thomas, American writer: b. Liberty, Tenn., 1 Feb. 1857. He practised law for several years and has since been connected editorially with St. Louis and Tennessee journals. He has published 'Poems and Dialect Pieces' (1894); 'Showers and Sunshine,' verse (1896); 'The Backward Trail' (1899); 'An Autumn Lane and Other Poems' (1899); 'Great Southerners' (1900).

Halévy, Jacques François Fromental Elie, zhāk frān-swā frō-mōn-tāl ā-lē ā-lā-vē, French composer: b. of Jewish parentage, Paris 27 May 1799; d. Nice, France, 17 March 1862. He studied counterpoint under Cherubini for five years, and in 1819 was sent to Italy to finish his education. The first of his pieces performed was a little comic opera, 'L'artisan,' given at the Théâtre Feydau, in 1827. His chef d'œuvre, 'La Juive,' appeared in 1835, and rapidly obtained a European celebrity, and has been frequently sung in the United States. Among his other works are 'L'Eclair'; 'Guido et Ginevra'; 'La Reine de Chypre'; 'Le Val d'Andorre'; 'La Fée aux Roses.' The melodies of Halévy are always soft and flowing, the harmony correct and pleasing; but his works display on the whole more talent than genius.

Halévy, Joseph, zhō-zēf, French Orientalist and traveler: b. Adrianople, Turkey, 15 Dec. 1827. In 1868 he traveled in Abyssinia; and for the Académie des Inscriptions he traversed (1869-70) Yemen, where he obtained copies of not less than 686 inscriptions, largely Himyaritic and Sabæan. He was appointed assistant librarian of the Asiatic Society, and adjunct-professor of Ethiopic in the Ecole des Hautes Etudes. Well known also as a Biblical critic and Assyriologist, he founded (1893) the 'Revue Sémitique d'épigraphie et d'histoire ancienne,' and published numerous works, including: 'Archæologic Mission to Yemen' (1872); 'Journey to Nedjran' (1873); 'Sabæan Studies' (1875); 'The Origin of Babylonian Civilization' (1876); 'Miscellany of Criticism and History Regarding Semitic Peoples' (1883).

Halévy, Ludovic, lū-dō-vēk, French dramatist and novelist: b. Paris, France, 1 Jan. 1834;

HALF BLOOD — HALF-TONES

d. there 8 May 1908. He was unsuccessful at first, but finally worked his way into public favor, especially after associating his pen with that of Henri Meilhac. In collaboration with the latter, he wrote many of the librettos of Offenbach's most brilliant and satiric operettas, including 'The Perichole,' 'The Brigands,' the 'Belle Hélène,' and 'The Grand Duchess of Gérolstein.' Several serious librettos of high excellence are from the same hands, including that for Bizet's 'Carmen.' In spoken drama, 'Frou-Frou' and 'Tricoche and Cacolet' are among the most popular plays the two dramatists produced together. In 1881 he ceased writing for the stage, and turned to fiction. 'L'Abbé Constantin,' the first of his novels, is also the most popular, and opened to him the French Academy. It was for more than one season the French story of the day. It is a charming story, full of fresh air and sun, simply and skilfully told. It presented a view of American character and temperament not usual in French fiction; and irreproachable in its moral tone, has become a sort of classic for American schools and colleges. 'La Famille Cardinal' (The Cardinal Family) and 'Crichtette' are studies in fiction of aspects of Parisian life. 'Notes and Souvenirs' embody observations during the Prussian invasion of 1871. They are interesting, as giving faithful pictures of the temper of the people during those days. Among his short stories, 'Un Mariage d'Amour' (A Marriage for Love) is one of the best.

Half Blood, in law, the relationship of persons born of the same father but not of the same mother, which is called a consanguinean relation; or of those born of the same mother but not of the same father, which is termed uterine. In the succession to real or landed property a kinsman of the half blood inherits next after a kinsman of the whole blood in the same degree, and after the issue of such kinsman when the common ancestor is a male, but next after the common ancestor when such ancestor is a female. So that brothers consanguinean inherit next after the sisters of the whole blood and their issue; and brothers uterine inherit next after the mother.

Half-breeds, the children of parents of different races; a term usually confined to whites and American Indians. There are two tribes of Indian half-breeds, at Red River Settlement, chiefly employed in agriculture and hunting. The rise of independent half-breed tribes is "the first step toward the evolution of a distinct race."

Half-caste, a person born of a European father and a Hindu or Mohammedan mother, or more rarely of a Hindu or Mohammedan father and a European mother; an East Indian.

Half-crown, a British silver coin of the value of two shillings and sixpence (60 cents).

Half-dollar, a silver coin of the United States of the value of 50 cents. Authorized in April 1792, its coinage at a weight of 208 grains was begun in 1794; its issue was suspended from 1798 to 1800 inclusive and in 1816. In 1853 its weight was reduced to 192 grains. The half-dollar is legal tender to the amount of ten dollars.

Half-eagle, a gold coin of the United States of the value of five dollars, so called from

the national emblematic bird which figures upon the reverse. Authorized in 1792 the coinage was begun in July 1795; there was no issue in 1816 and 1817.

Half-King, the name given by the English to a Seneca Indian, chieftain of an Ohio tribe, who accompanied Washington during his expeditions in 1753-54, and was present at the defeat of the French at Great Meadows. His summary of the prowess of the respective combatants was that "the English acted like fools and the French like cowards."

Half Moon, the name of the vessel commissioned by the Dutch East India Company in 1609, and commanded by Henry Hudson for a voyage of exploration in search of a Northwest Passage. In this ship he entered New York Bay and explored the river which bears his name.

Half-tones, pictures produced by printing from plates made by the half-tone process, which will here be described. Except that used in line-drawing, until early in the eighties there was no process by which paintings, wash-drawings, or photographs could be done into the form of a surface printing-block for the press, and the introduction then of the half-tone block marked a revolution in the history of photographic illustration. The development of the process was the result of a kind of evolution of Bullock's (1866). Meisenbach of Munich patented a half-tone process in 1882.

The American Frederic Eugene Ives and others have since experimented and published results, and by them within a few years the process as it now exists was practically established. Americans were first in the field with an improved device for breaking up the image into dots, which was so much superior to anything invented in Europe that almost every other method was dropped in its favor. The diamond-ruled screen, which was introduced in this country by Max Levy, is essential to advanced work in half-tone. To make one of the screens, a sheet of the finest plate-glass is coated with a varnish of asphalt and wax, and placed on the bed of an automatic ruling-machine capable of ruling lines of any fineness up to 500 to the inch. The cutter is diamond-pointed and gauged to cut lines of any desired width. The lines are ruled diagonally at 45° across the glass, the number to the inch varying as required. The ruled surface is treated with hydrofluoric acid, which eats into or etches the lines laid bare by the diamond and forms a channel which is filled up with an opaque pigment. This enamel is baked in the lines in an oven, and then the surface is polished until the lines are perfectly level and the spaces represented by the clear glass are bright and transparent. Two of these ruled glasses are required for each screen, laid together with the lines crossing at right angles and cemented with Canada balsam.

To produce a half-tone block from a picture, wash-drawing, or photograph, this ruled grating is placed in front of the sensitive plate, not in contact with it, but at a distance which must be nicely determined by experience. Everything is represented by dots so accurately graded in relation to the light and shade of the original that the eye scarcely detects them, and the half-tone picture appears as a practical facsimile of the original from which it was photographed.

HALF-WAY COVENANT — HALIFAX

Most half-tone blocks are now etched on copper, and the sensitizing solution generally employed for this metal is a compound of fish-glue, albumen, chromic acid, water, and bichromate of ammonia. The copper is cleaned with tripoli and washed; the sensitizing solution is flowed over it two or three times; it is placed on a revolving table and rapidly whirled to spread the coating thinly and evenly; the coating is dried by gentle heat in a yellow-lighted room, and the plate is now ready for exposure under the half-tone negative. Three to ten minutes' exposure to an electric arc-light completes the printing, then the plate is given a bath in cold water, and is soaked and washed under a spray of water until the compound not acted upon is dissolved out. The image on the metal at this stage is almost invisible. To facilitate an examination of the film, the plate is dipped into a solution of methyl-violet, which stains the film and brings the picture into view. If all is right, the surface is dried either by flowing it with methylated alcohol or by gentle heat. The next operation is the hardening of the glue-picture into a substance resembling enamel — hence the "enameline process." The plate is highly heated over the flame of a large Bunsen burner; during the progress of this "burning in" or enameling, the blue picture gets pale, then gray, and vanishes; as the plate gets hotter, the image appears as a faint brown, and increases in strength to a rich chestnut-brown tint, when the heat must be withdrawn, and the plate cooled off. The plate has now upon it a picture formed of a strong, hard, impermeable coat of enamel which will bear any reasonable etching without further protection.

The etching-bath is made up of neutral perchloride of iron dissolved in water, and of a strength which registers 35° with a Baumé's hydrometer. The plate is first subjected to a general etching, so that it may be inked over with a printer's roller, and a first proof of the photo-etched picture be pulled in the press. The dulling of the general effect caused by the interposition of the necessary screen-grating has to be removed as far as possible, and this is done by artists who are specially trained for the work. The parts of the picture which are in shadow and are usually correctly rendered by a properly exposed negative are covered over with varnish, and the next tones are etched again; then these tones are covered up and the high lights are treated until the resulting picture, when proofed, correctly represents the original. The plates are then trimmed by engravers, beveled to admit of being riveted to the wood-mounts, and are mounted type-high for use in the printing-press.

Invention and experiment are now active toward the next great step in half-tone work, the production of surfaces without the mechanical smoothness hitherto so persistent. What is aimed at is the making of pictures which are free from mechanical effect, and are yet sufficiently delicate in texture to retain the finer details.

Half-way Covenant, a concession in church requirements made by the New England Synod convened at Northampton in 1657, whereby persons who had been baptized in their infancy, who assented to the doctrines of faith, entered into covenant with the church, and led decent and respectable lives; were admitted to

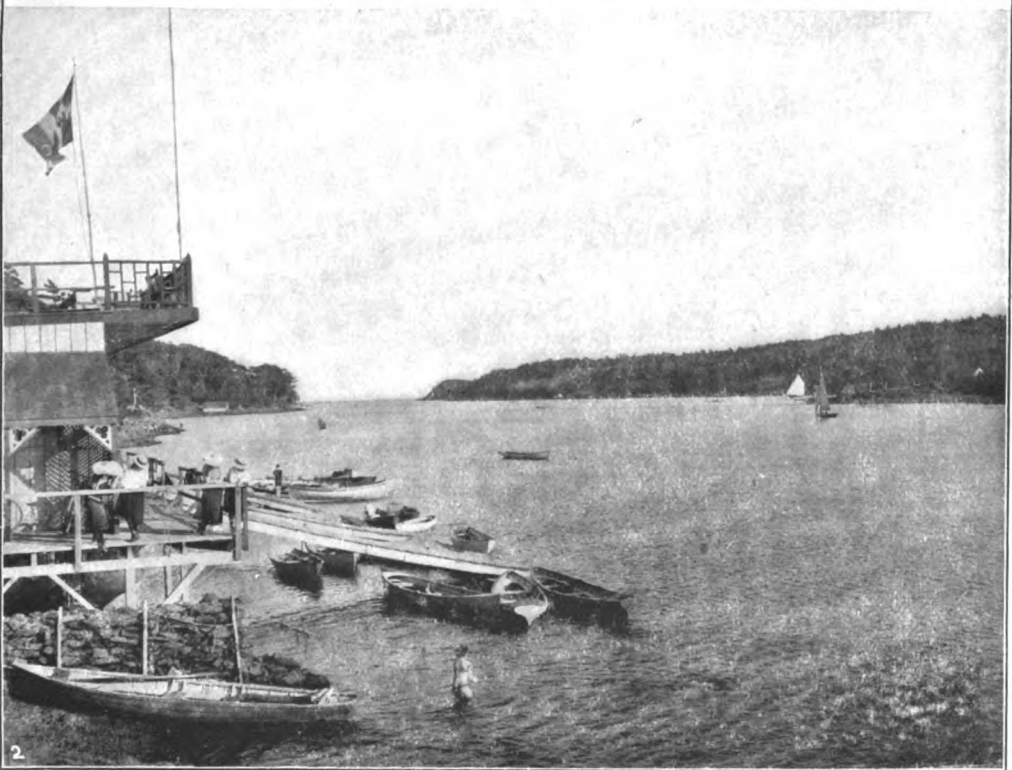
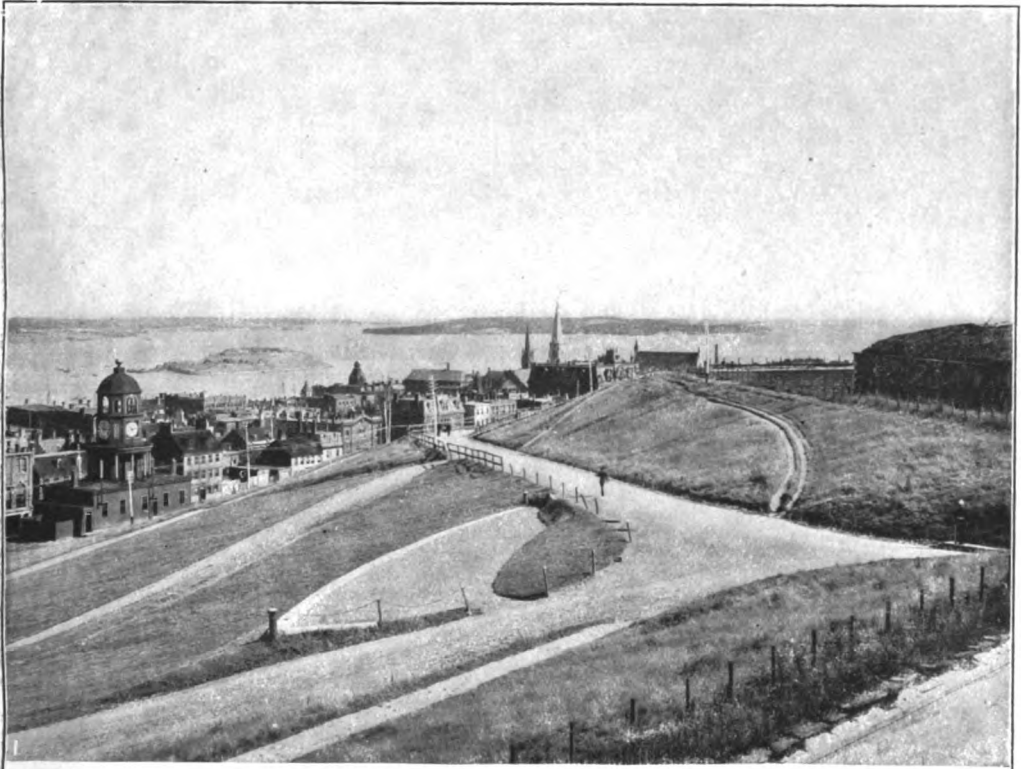
the privileges and prerogatives of church-membership with the exception of the Lord's Supper, although they might give no evidence of conversion and had neither the ability nor willingness to make profession of religious experience. This "half-way covenant" as it came to be called aroused bitter controversy which did not die out until the 19th century; among its most strenuous opponents were Jonathan Edwards and his followers. The contention is baseless that it entailed certain civil privileges in relation to the State franchise, its chief aim being to admit children to baptism and to transmit to them the same degree of church membership as their parents. Consult Walker, 'Creeds and Platforms of Congregationalism' (1893).

Haliburton, hăl'i-bér-tôn, **Thomas Chandler**, Canadian humorist: b. Windsor, Nova Scotia, December 1796; d. Isleworth, near London, 27 Aug. 1865. He practised law in Halifax, and in 1842 became judge of the supreme court of Nova Scotia, but subsequently gave up his profession, and went to live permanently in England. His first work was a 'Historical and Statistical Account of Nova Scotia' (1820). In 1835 he contributed a series of letters to a Halifax newspaper, under the pseudonym of "SAM SLICK," clock-peddler. These were published with considerable alterations and additions, in a collected form in 1837, under the title of 'The Clockmaker, or Sayings and Doings of Samuel Slick of Slickville,' and became very popular. A second series followed in 1838, and a third in 1840. In 'The Attaché, or Sam Slick in England,' his hero is represented as attaché of the American embassy at the court of St. James, and again appears in 'Sam Slick's Traits of American Humor' (1852). Another work of his of some importance is 'Rule and Misrule of the English in America' (1851). In 1859 Haliburton was elected member of parliament for Launceston.

Hal'ibut, the largest of the flat fishes (*Hippoglossus vulgaris*), and one of the most important and highly prized food-fishes. It occurs in all Northern waters, south to France, New York and San Francisco. It reaches a weight of 400 pounds, and is characterized by having the eyes on the right side, the ventral fins and mouth symmetrical, and the lateral line arched in front. It is dark brown on the right side, and white on the left or lower side. It was formerly very abundant along the whole eastern coast of the United States, at times proving a nuisance from its numbers to the cod-fishers. It has gradually become scarcer, and at the same time the appreciation of it as a food-fish has increased, so that the halibut fishers have gone farther and farther for it until now a good proportion of the catch comes from the waters around Iceland. A second species, the Greenland halibut (*Reinhardtius hippoglossoides*) occurs in the Arctic Atlantic, but is not very common. It is yellowish brown and has a straight lateral line. In the trade this is not distinguished from the common species. Halibut are taken with hook and line (or trawls) using fresh fish (herring, etc.) for bait.

Halifax, **Charles Montague**, EARL OF, English politician: b. Horton, Northamptonshire, 16 April 1661; d. 19 May 1715. He first attracted notice by his verses on the death of Charles II.;

HALIFAX, N. S.



1. City of Halifax from the Citadel

2. North West Arm

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HALIFAX—HALL

and in 1687, in conjunction with Matthew Prior, wrote 'The Town and Country Mouse,' a parody on Dryden's 'Hind and Panther.' He became a lord of the treasury in March 1692, in 1694 was made chancellor of the exchequer; in 1695 carried out the much needed re-coinage, appointing Newton warden of the mint; and in 1696 he devised the system of exchequer bills. His administration was distinguished by the adoption of the funding system, and by the establishment of the Bank of England. In 1700 he was raised to the peerage, under the title of Baron Halifax. In the reign of Anne he remained out of office, but he actively exerted himself to promote the union with Scotland, and the Hanoverian succession. George I. created him an earl, and bestowed on him the order of the Garter. The 'Life and Miscellaneous Works of Lord Halifax' were published in 1715, and his poems were included in the edition of 'English Poets' by Dr. Johnson.

Halifax, Canada, the capital of the province of Nova Scotia, and county-seat of Halifax County, a city and port of entry on Halifax Harbor, on the Intercolonial and Dominion, and Canadian Pacific R.R.'s. The harbor, originally known as Chebucto, "chief of havens," is one of the best in the world. It is 16 miles long from north to south, with an average width of a mile, and terminates in Bedford Basin, a beautiful sheet of water four miles wide, affording 10 square miles of safe anchorage. The North West Arm, an inlet on the west of the city, is a charming bay, on the shores of which are many of the villa residences of the wealthier Haligonians. The harbor is protected by 11 forts and batteries. A citadel crowns the hill, on the slopes and at the base of which the town is built. The streets are regularly laid out on a rectangular plan, are lighted by gas and electricity, and have electric street-car lines. The public buildings are built chiefly of freestone; the houses of wood. The most notable structures include Government House, the official residence of the lieutenant-governor, the armories, the post-office, the custom-house, the Province building, court-house, city-hall, Masonic Temple, Academy of Music, the Admiralty House, the Wellington barracks, several hospitals, and other charitable institutions, the Roman Catholic and Anglican cathedrals, and Saint Paul's church, the oldest Protestant church building in British North America. Among the higher educational institutions are the non-sectarian Dalhousie University and College (q.v.), the Roman Catholic College of Saint Mary, the Presbyterian Theological College, the Halifax Ladies' College and Conservatory of Music, and a high school. The city maintains a free library, an excellent waterworks system, and fine parks, including Point Pleasant Park, and the handsome public gardens covering 17 acres. Halifax is the chief British naval station in North America, and has extensive dockyards; besides Esquimaux it is the only military post in Canada garrisoned by British imperial troops; in 1901 the garrison amounted to 1,784 soldiers. Halifax has railroad communications with all parts of the Dominion and the United States, and steamship lines connecting with Great Britain, the West Indies, Boston, and New York. A United

States consul-general is resident in Halifax. The chief occupations of the inhabitants are commerce and fisheries. The city has considerable West Indian trade, exporting lumber, fish, and agricultural products, and importing sugar, rum, molasses, and other sub-tropical products; most of the commerce of the province is carried on through Halifax. The principal manufactures are iron castings, machinery, agricultural implements, nails, paints, gunpowder, cordage, leather, boots and shoes, clothing, soap and candles, cotton and woolen goods, and woodenware; there are also sugar refineries, distilleries, and breweries.

Halifax was founded in 1749 by the Hon. Edward Cornwallis, and named in honor of the Earl of Halifax. The following year it was made the capital of Nova Scotia, then including New Brunswick, in place of Annapolis; in 1817 it was declared a free port; in 1842 it was incorporated as a city. It is governed by a mayor, elected annually, and by 18 aldermen, elected triennially. The city and county send two members to the Canadian House of Commons, and three to the Provincial Legislature. Pop. about 45,000.

JOHN FORREST,
President Dalhousie College.

Halifax Commission, the designation for the commission of representatives of Great Britain and the United States which met at Halifax, Nova Scotia, in 1877, to determine the amount of compensation to be paid by the United States for the privileges which under the provisions of the fisheries treaty of 1871 between the two countries, had allowed the fishermen of the United States to take fish along the shores of Canada and Newfoundland. The great value of the British fishing waters was admitted and the sum of \$5,500,000 was awarded Great Britain. The ten-year treaty which went into operation in 1873 was terminated by the U. S. government in 1885, and an attempt to renew it by the Chamberlain-Bayard Treaty in 1888 was frustrated by the rejection of the United States Senate. A *modus vivendi*, however, was arranged for, which the Dominion Parliament enacted as a law in 1890.

Hal'ite, the mineralogical name for native common salt, rock salt, or sodium chlorid, NaCl. Halite crystallizes in the isometric system, usually in cubes. It has a hardness of 2.5, and a specific gravity of 2.135 when pure, though it often occurs mixed with calcium sulphate, and with the chlorids of calcium and magnesium, the specific gravity being modified accordingly. Halite is usually colorless or white, though it is sometimes colored by impurities. Its refractive index for yellow sodium light is 1.5442, and transparent crystals of it are used somewhat in the manufacture of prisms and lenses, since the mineral is far more transparent than glass to the infra-red rays of the spectrum. Tyndall made extensive use of it in this way, for example, in his researches on radiant heat. (Consult his 'Contributions to Molecular Physics in the Domain of Radiant heat.') See SALT; SODIUM.

Hall, Alexander Wilford, American editor and author: b. Bath, N. Y., 18 Aug. 1819; d. 1902. He became known as an evangelist especially through attacks on Universalist doctrine and the theory of evolution presented by Darwin, Huxley, and Haeckel. In 1881 he established

'The Microcosm,' and in 1803 became president of the Society for Philosophical Research. In 1801 he was elected fellow of the Philosophical Society of Great Britain. His works include: 'Universalism Against Itself'; 'The Problem of Human Life'; 'The Immortality of the Soul'; and 'The Hygienic Secret of Health.'

Hall, Anna Maria Fielding, British novelist: b. Dublin, Ireland, 6 Jan. 1800; d. East Moulsey, Surrey, England, 30 Jan. 1881. In her 15th year she went to London, where she was married to the well known writer, S. C. Hall (q.v.). She published 'Sketches of Irish Character' (1828); 'The Buccaneer' (1832); 'Tales of Woman's Trials' (1834); 'The Outlaw' (1835); 'The French Refugee,' a drama; 'Uncle Horace' (1837); 'Lights and Shadows of Irish Character' (1838); 'Marian' (1839); 'Midsummer Eve' (1843); 'The Whiteboy' (1845); etc. Her 'Stories of the Irish Peasantry' appeared originally in 'Chambers's Journal.' Besides assisting her husband in writing 'Ireland: its Scenery, etc.' (1841-3) and other works, she assisted in the establishment of a hospital for consumptives, and the Nightingale Fund, which resulted in the endowment of a training-school for nurses.

Hall, Arthur Crawshaw Alliston, American Protestant Episcopal bishop: b. Benfield, Berkshire, England, 12 April 1847. He was graduated from Christ Church, Oxford, in 1869, took orders, entered the Society of St. John the Evangelist (Cowley Fathers), in 1874 became assistant minister of the Church of the Advent, Boston, and from 1882 to 1891 was there minister of the mission church of St. John the Evangelist. In 1894 he was consecrated bishop of Vermont, after release from the Cowley order. His publications include: 'Confession and the Lambeth Conference' (1879); 'Meditations on the Creed' (1880); 'Meditations on the Collects' (1887); and other doctrinal and devotional works.

Hall, Asaph, American astronomer: b. Goshen, Litchfield County, Conn., 15 Oct. 1829; d. Annapolis, Md., 22 Nov. 1907. After private study he attended Central College, McGrawville, N. Y., in 1854-5, was for a term a pupil of Francis Brunnnow at the University of Michigan, taught at Shalersville, Ohio, and later was appointed assistant to Bond in the Harvard observatory. He became assistant in the Naval Observatory at Washington in 1862, and in 1863 professor of mathematics in the navy, with relative rank of captain. He continued in the government service until 1891, when he was retired on account of age, with relative rank of captain. While at the Naval Observatory, he was despatched on several expeditions, including those for observation of solar eclipses to Bering Strait in 1869, to Sicily in 1870, and to Colorado in 1878. He was also in charge of the American party sent to observe the transit of Venus at Vladivostok, Siberia, in 1874, and chief astronomer of the expedition to San Antonio, Tex., for the transit of 1882. Among his many discoveries the most important is that of the moons of Mars (August 1877), which he named *Deimos* and *Phobos*, and whose orbits he calculated. Among his later work is a valuable study of double stars. In 1895-1901 he was professor of astronomy at Harvard. He received the Lalande prize of the French Academy of Sciences in 1878, its Arago medal in 1895, and the gold

medal of the Royal Astronomical Society in 1879. In 1902 he was president of the American Association for the Advancement of Science.

Hall, Basil, British naval officer and writer: b. Edinburgh 31 Dec. 1788; d. Portsmouth, England, 11 Sept. 1844. He entered the navy in 1802, accompanied Lord Amherst's expedition to China in 1815, a trip which supplied him with the materials of his first work, 'A Voyage of Discovery to the West Coast of Corea, and the great Loo Choo Island in the Japan Sea.' This work, first published in 1818, had a very extensive circulation. In 1827 he made a tour in Canada and the United States, and published his 'Travels in North America' (1829), a work which excited much adverse criticism in the United States by reason of its outspoken and somewhat supercilious comments and observations. 'Fragments of Voyages and Travels' appeared in 1831-33, and was followed by 'Schloss Hainfield, or a Winter in Styria' and 'Patchwork' (1841).

Hall, Bolton, American lawyer and lecturer: b. Ireland 1854. A son of John Hall (q.v.), he was graduated from Princeton in 1875, became known as a writer and lecturer in connection with various reforms, and has been identified with the University extension movement. Among the causes advocated by him are the cultivation of vacant lots by the unemployed, and the restoration of the land to the people. His publications include: 'Even as You and I.'

Hall, Charles Cuthbert, American Presbyterian clergyman: b. New York 3 Sept. 1852; d. New York 25 March 1908. He was graduated from Williams College in 1872, studied theology at the Union Theological Seminary 1872-3, and at the Presbyterian College in London and the Free Church College, Edinburgh. He was pastor of the Presbyterian Church, Newburg, N. Y., 1875-7, and of the 1st Presbyterian Church, Brooklyn, N. Y., 1877-97. In 1897 he was elected president of Union Theological Seminary. He published 'Into His Marvellous Light' (1891); 'Does God Send Trouble?' (1894); 'The Children, the Church and the Communion' (1895); 'The Gospel of the Divine Sacrifice' (1896).

Hall, Charles Francis, American Arctic explorer: b. Rochester, N. Y., in 1821; d. Thank God Harbor, Greenland, 8 Nov. 1871. Becoming interested in the fate of the Franklin expedition, he devoted his leisure to gathering information about Arctic America, and made two search expeditions, in 1860-2 and 1864-9, living alone among the Eskimo, and bringing back relics of the Franklin expedition and the supposed bones of one of Franklin's company. Natives whom he encountered in 1869 near the southern shore of King William Land gave him a report of the fate of 79 of the 105 who perished by starvation in that region. He thus contributed much to the details of the expedition's final history. In 1871 he sailed in command of the government ship 'Polaris,' on an expedition to the North Pole. On 29 August he reached 82° 11' N., at that date the highest north latitude ever reached. Then turning south he went into winter quarters at Thank God Harbor, Greenland (81° 38' N.). Here he was taken suddenly ill, and died. Over his grave a grateful epitaph was placed by the British polar expedition in 1876. His compan-



ASAPH HALL,
LATE PROFESSOR OF ASTRONOMY, HARVARD UNIVERSITY.

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ions left Thank God Harbor in August, 1872, but in October, through the ice-anchor slipping, 19 men were left with stores on a floe, and only after five months of severe sufferings were they rescued by a sealer off the Labrador coast in the following April. The 'Polaris' drifted to the coast of Greenland, at a point not far south of Smith Sound, and thence in the spring the party set out in boats and was rescued by the Scotch whaler 'Ravenscraig,' off Cape York. Among the valuable results of Hall's work were the exploration of Kennedy channel, the discovery of Robeson Channel and Hall Basin, and the extension of Greenland and Grinnell Land $1\frac{1}{2}^{\circ}$ N. Hall was less a scientist than a fearless and resourceful explorer. He published 'Arctic Researches, and Life among the Esquimaux' (1864); and mainly from his papers was compiled the 'Narrative of the Second Arctic Expedition' (1879).

Hall, Charles Winslow, American lawyer and author: b. Chelsea, Mass., 2 Nov. 1843. He was admitted to the Suffolk bar in 1866 and besides editing various New England journals has written: 'Arctic Rovings' (1861); 'Twice Taken' (1867); 'Adrift in the Icefields' (1877); 'Drifting Round the World' (1881); 'Legends of the Gulf'; 'Cartegena, or the Last Brigade'; 'Regiments and Armories of Massachusetts.'

Hall, Chester Moor, English inventor: b. Leigh, Essex, England, 9 Dec. 1703; d. Sutton, Essex, 17 March 1771. He was a large landowner in Essex, and convinced from study of the human eye that achromatic lenses were possible, he discovered two varieties of suitable glass in 1729, and in 1733 made several telescopes later declared by experts to be achromatic. Indifferent to his claims of priority, he did not appear at the trial of Dollond v. Champness. Later his invention of the achromatic telescope in the year 1733 was adjudged by Lord Mansfield conclusively proven.

Hall, Christopher Newman, English Congregational clergyman: b. Maidstone, England, 22 May 1816; d. London 18 Feb. 1902. He was educated at Highbury College and ordained in 1842, his first charge being at Hull. In 1854 he was made pastor of Surrey Chapel, Blackfriar's Road, London, from which place he moved with his congregation into Christ Church, Westminster Bridge Road, erected mainly through his exertions, and of which he became pastor emeritus in 1893. During the Civil War he did much by tongue and pen to give his countrymen correct ideas of the nature of the struggle in the United States. In 1865 he visited this country and again in 1873 when he delivered lectures in the principal cities. He was the author of 'The Christian Philosopher'; 'Land of the Forum and the Vatican'; 'Lectures in America'; and of a famous tract 'Come to Jesus' (1840) of which millions of copies have been issued, etc.

Hall, Edward Henry, American Unitarian clergyman and author: b. Cincinnati, Ohio, 16 April 1831. He was graduated from Harvard in 1851, ordained to the Unitarian ministry in 1859, and was pastor at Plymouth, Mass., 1859-67; Worcester, Mass., 1869-82; and at Cambridge, Mass., 1882-93. His writings include, besides a volume of 'Discourses'; 'Orthodoxy and Heresy in the Christian Church'; 'Lessons on the Life of St. Paul'; 'Papias and his Con-

temporaries: a Study of Religious Thought in the 2d Century' (1899).

Hall, Fitzedward, American philologist: b. Troy, N. Y., 21 March 1825; d. Marlesford, England, 1 Feb. 1901. He was graduated from Harvard in 1846; spent many years in India; made a thorough study of its tongues, and contributed to its local journals original translations and original articles. In 1850 he became tutor, in 1853 professor, in the government college at Benares; in 1855 was transferred to Ajmere as inspector of schools for Ajmere and Maiwara; and in 1856 to a like post in the Central provinces. In 1862-79 he was professor of Sanskrit, Hindustani, and Indian jurisprudence in King's College, London; in 1864 became examiner in Hindustani and Hindu to the civil-service commission; in 1880 examiner in Sanskrit to succeed Max Müller; and in 1887 also examiner in English. He was the first American to edit a Sanskrit text—'The Atmabodha, with its Commentary, and the Tattvabodha' (1852). He prepared also an edition of the 'Vishnu-purāna,' containing numerous quotations from manuscripts owned by him; and editions of many other Sanskrit books. His collection of 1,000 Oriental manuscripts and 1,000 works on special subjects, he gave to Harvard. He wrote further: 'Modern English' (1873), 'Doctor Indoctus' (1880), and other works on English philology, and contributed to the 'New Oxford Dictionary.'

Hall, Florence Marion Howe, American author and lecturer: b. Boston 25 Aug. 1845. She is a daughter of Julia Ward Howe (q.v.). Prominent in the women's club movement, she became vice-president of the General Federation of Women's Clubs, and chairman of the educational department of the New Jersey State federation of women's clubs. In 1893-1900 she was president of the New Jersey Women's Suffrage Association. Her writings are: 'Social Customs' (1887); 'The Correct Thing' (1888).

Hall, Francis J., American Episcopal theologian: b. 24 Jan. 1856. He was graduated from Racine College, Wis., and the General Theological Seminary, New York, and has been professor of dogmatic theology in the Western Theological Seminary from 1886. He has published 'Theological Outlines' (1892-5); 'Historical Position of the Episcopal Church' (1896); 'The Kenotic Theory' (1898).

Hall, George Henry, American artist: b. Boston 1825. He studied art at Düsseldorf, Paris, and Rome; established his studio in New York; and became known as a still-life and figure painter. In 1868 he was elected a national academician. Among his works are 'April Showers'; 'Studies of Grapes'; 'The Seasons'; and 'Bric-a-Brac of Damascus'.

Hall, Gertrude, American writer: b. Boston 8 Sept. 1863. She has written 'Far from To-day,' a collection of short stories; 'Allegretto,' a book of verse; 'Foam on the Sea, and Other Tales'; 'The Hundred and Other Stories' (1898); 'The Age of Fairy Gold,' verse (1899); 'April's Sowing' (1900). Her work, both in verse and prose, is distinctively original.

Hall, Gordon, American missionary at Bombay: b. Tolland, Mass., 8 April 1784; d. Bombay 20 March 1826. He was graduated at

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Williams College in 1808 and having studied theology, offered himself as a missionary to the American board of commissioners for foreign missions. Ordained at Salem in February 1812, he sailed the same month for Calcutta and arriving at Bombay in 1813, spent 13 years in missionary labors. No missionary in western India has been more respected among the Brahmins and higher classes than he. Beside publishing several missionary tracts he revised the Mah-ratta New Testament.

Hall, Granville Stanley, American psychologist and college president: b. Ashfield, Mass., 6 May 1845. He was graduated from Williams College in 1867, studied also at Berlin, Bonn, Heidelberg, and Leipsic, was professor of psychology in Antioch College (Ohio) in 1872-6, and lecturer on psychology at Harvard and Williams in 1880-1. From 1881 to 1888 he was professor of psychology in the Johns Hopkins University; and in 1888 became president of Clark University, then newly founded at Worcester, Mass., and professor of psychology in the institution. He soon became known as an authority on education and a leader in the "new psychology." As editor of the 'Pædagogical Seminary' and the 'American Journal of Psychology,' he published: 'Aspects of German Culture' (1881); 'Hints toward a Select and Descriptive Bibliography of Education' with Mansfield (1886); 'Methods of Teaching History'; 'How to Teach Reading'; etc.

Hall, Isaac Hollister, American Oriental scholar: b. Norwalk, Conn., 12 Dec. 1837; d. Mount Vernon, N. Y., 2 July 1896. Graduated from Hamilton College in 1859, he was there tutor until 1863, in 1865 was graduated from the Columbia Law School, and until 1875 was a practitioner in New York. In 1875-7 he was professor in the Syrian Protestant College at Beirut, and later at Cyprus aided Gen. di Cesnola, then United States consul, in the arrangement of the Cypriote collection now in the Metropolitan Museum of New York. From 1884 until his death he was curator of sculpture and archæology in the Metropolitan Museum. He also lectured on New Testament Greek at the Johns Hopkins University; published (1884) an account, with facsimile pages, of the Syrian manuscripts of the Gospels, Acts, and the larger part of the Epistles, discovered by him (1876) at Beirut; and compiled a 'Critical Bibliography of the Greek New Testament' (1884).

Hall, Sir James, English geologist and chemist: b. 1761; d. Edinburgh 23 June 1832. Early interested in geological questions, he made the acquaintance of James Hutton (q.v.) and Playfair, and himself states that he came to adopt Hutton's system after three years of almost daily discussion with its founder. In the examination of this system, whose leading principle explains the conformation of the earth's crust by the action of constant natural changes, he traveled in Scotland, the Alps, Italy, and Sicily. Hall was the first geologist directly to apply chemical laboratory tests to the hypotheses of geology, but published no results of his work in this field until after the death (1797) of Hutton who objected to the judgment of the vast operations of nature through "having kindled a fire and looked into the bottom of a little crucible." He was elected president of the Royal Society of

Edinburgh, invented a machine for the regulation of high temperatures, and in 1807-12 represented Michael (or Mitchell), Cornwall, in Parliament. He wrote various scientific memoirs.

Hall, James, American lawyer and author: b. Philadelphia 19 Aug. 1793; d. near Cincinnati, Ohio, 5 July 1868. He served in the army 1812-18, and subsequently studying law became judge of the circuit court of Illinois, and also State treasurer. In 1833 he took up his residence in Cincinnati, and devoted himself to banking and literature. His chief works are: 'Legends of the West'; 'Harpe's Head, a Legend of Kentucky' (1833); 'Sketches of the West' (1835); 'Tales of the Border' (1835); 'Notes on the Western States' (1838); 'History of the Indian Tribes' (1838-44) with McKenney; 'The Wilderness and the War-Path' (1845); 'Romance of Western History' (1859).

Hall, James, American geologist and palæontologist: b. Hingham, Mass., 12 Sept. 1811; d. near Bethlehem, N. H., 7 Aug. 1898. He studied at the Rensselaer Polytechnic School for six years, and was subsequently professor of geology there, and in 1837 was appointed to a position on the New York Geological Survey. In 1855 he was appointed State geologist of Iowa. In 1850 he was elected by the Royal Geographical Society of London one of its 50 foreign members, and in 1858 received the Wollaston Medal from that scientific body. He was a distinguished member of many scientific societies at home and abroad and was held in the highest esteem for his attainments in geology and palæontology. Among his publications may be named 'Geology of New York' (1843); 'Palæontology of New York' (1847 *et seq.*); 'Graptolites of the Quebec Group' (1865); as well as parts of the Geological Reports of Iowa (1858-9); and Wisconsin (1862).

Hall, John, American Presbyterian clergyman: b. near Armagh, Ireland, 31 July 1829; d. Bangor, County Down, Ireland, 17 Sept. 1898. He was educated at Belfast College and after holding several pastorates in Ireland, in 1867 became pastor of the Fifth Avenue Presbyterian Church, New York. He was chancellor of the University of the City of New York 1882-90, and was also trustee of Princeton University, Union Theological Seminary, and of Wellesley College. He was noted for his simple eloquence and impressive sincerity and was one of the most prominent clergymen in his denomination. He wrote 'Family Prayers for Four Weeks' (1868); 'Papers for Home Reading' (1871); 'Questions of the Day' (1873); 'God's Word through Preaching' (1875); 'Foundation-Stones for Young Builders' (1879); 'A Christian Home: how to Make and how to Maintain It' (1883).

Hall, John M., American railroad president: b. Willimantic, Conn., 16 Oct. 1841; d. New Haven, Conn., 27 Jan. 1905. He was graduated from Yale in 1866 and from the Columbia Law School in 1868. He took up the practice of law in his native town and became a judge of the superior court in 1889, resigning in 1893 to become vice-president of the New York, New Haven and Hartford Railroad Company. On the death of President Clark in 1899, Judge Hall succeeded him as president.

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Hall, Joseph, English prelate: b. near Ashby-de-la-Zouch, Leicestershire, 1 July 1574; d. near Norwich 8 Sept. 1656. While yet in college he published his 'Virgidemiarum,' a series of poetical satires, remarkable for elegant and energetic versification, strong and lively coloring, and masterly traces of genuine humor. Having taken orders he obtained the rectory of Halsted, near St. Edmund's Bury, where he published a very popular work, 'A Century of Meditations.' In 1617 he became dean of Worcester, and was raised to the see of Exeter in 1627. After the open rupture between the king and Parliament, he came forward in defense of the liturgy and discipline of the church, against the views which the leading Nonconformists had published, in a treatise called, after the initials of the names of its authors, 'Smectymnuus' (q.v.). In the end of 1641 Bishop Hall was translated from the see of Exeter to that of Norwich, but was later imprisoned in the Tower with the other prelates who had protested against their expulsion from the House of Peers. In 1643 he was specially named in the ordinance passed for sequestering what were called "notorious delinquents." His prose works edited by Philip Wynter were published in 1863. Among the latter, the best known and most popular is his 'Contemplations,' which still finds many readers.

Hall, Lyman, American patriot: b. Wallingford, Conn., 12 April 1724; d. Burke County, Ga., 19 Oct. 1790. He was graduated from Yale in 1747, studied medicine, and began practice in Wallingford, Conn., but finally settled near Sunbury, Ga., where he became a leading physician. The settlers in this locality were from New England, and on the outbreak of trouble with England, they with Hall as leader took active part in the rebellion, though Georgia was slow in joining the patriot cause. Hall was sent by them as a representative to the Continental Congress, where he was admitted by a unanimous vote, and took part in all debates, but did not vote when the vote was taken by colonies, until Georgia was represented as a colony. In 1776 it was so represented, and Hall continued a member of the Congress till 1780, being one of those who signed the Declaration of Independence. He was elected governor of Georgia in 1783, and in an energetic administration of one year, he did much to repair the damage done by the war, established land offices and schools, and then retired from public life. Consult: Dwight, 'Signers of the Declaration' and an article, 'Lyman Hall' in the 'Magazine of American History,' XXV. 35.

Hall, Marshall, English physician and physiologist: b. Basford, near Nottingham, 18 Feb. 1790; d. Brighton, England, 11 Aug. 1857. In 1809 he commenced the study of medicine at the University of Edinburgh, and took his degree in 1812. In 1817 he commenced practice at Nottingham, and soon rose to eminence. In 1826 he settled in London, where he carried on a most successful practice. He paid especial attention to the symptoms of illness and in 1817 published 'Diagnoses of Diseases,' and in 1824 his 'Medical Essays' appeared. His 'Essay on the Circulation of the Blood' (1831) contained an account of his discovery of the so-called "caudal heart" in the tail of the eel. The more important of his other writings are: 'Lectures on the Nervous System and its Diseases' (1836), 'Theory and Practice of Medicine' (1837); 'Theory

of Convulsive Diseases' (1848). His services to the cause of humanity were numerous and valuable, and among these one of the most widely known is the method which he invented of restoring suspended respiration, now generally adopted in the case of persons partially drowned. It is known as the 'Marshall Hall Method.' See DROWNING.

Hall, Robert, English Baptist clergyman: b. Arnsby, Leicestershire, England, 2 May 1764; d. Bristol, England, 21 Feb. 1831. He studied at the Baptist College at Bristol and King's College, Aberdeen, and entered the Baptist ministry, becoming in a few years not only the most prominent minister in his denomination but one of the very foremost of English orators. He was also widely known as a master of prose style, his most noted writings being 'Apology for the Freedom of the Press' (1793); 'Modern Infidelity' (1800); 'Reflections on War' (1802). He was subject to attacks of insanity but in spite of this misfortune accomplished a vast amount of intellectual work and was a tireless student. His complete works in six volumes reached an 11th edition in 1853.

Hall, Robert Henry, American soldier: b. Detroit, Mich., 15 Nov. 1837. He was educated at West Point and served in the Federal army during the Civil War, and was in command of a brigade during the war in the Philippines. He became a brigadier-general in the United States army in 1901. He has published 'Register of the United States Army 1789-98'; 'History of the Flag of the United States'; 'History of United States Infantry Tactics.'

Hall, Ruth, American novelist: b. Schenectady, N. Y., 10 April 1858. Besides more or less journalistic work she has written: 'In the Brave Days of Old' (1898); 'The Boys of Scrooby' (1899); 'The Black Gown,' a novel of colonial Albany (1900); 'The Downreiter's Son,' a novel of the anti-rent troubles in New York State (1902); 'The Golden Arrow' (1903).

Hall, Samuel Carter, English miscellaneous writer: b. Topsham, Devonshire, England, 1801; d. 16 March 1889. For over 40 years he was the editor of the 'Art Journal,' which he founded in 1839. With his wife (Anna Maria) (q.v.) he published: 'Ireland, its Scenery and Character' (1841-3); 'Book of Royalty' (1838); 'A Woman's Story' (1857); 'The Book of the Thames' (1859); 'A Companion to Killarney' (1878); and others. His separate works were: 'A Book of Memories'; 'Book of British Ballads'; 'Baronial Halls'; 'Retrospect of a Long Life' (1883).

Hall, Thomas, American inventor: b. Philadelphia 4 Feb. 1834. He was educated at the University of Pennsylvania, and subsequently studied mechanics in Europe, and at the Paris exposition in 1867 placed a keyed typewriter on exhibition. His numerous inventions include a mechanism for printing by touching keys; a keyed typewriter, the Hall typewriter, first offered for sale in 1881; several sewing-machines, as well as drill-grinding and other machinist tools, etc.

Hall, Thomas Cuming, American theologian: b. Armagh, Ireland, 25 Sept. 1858. He was graduated from Princeton in 1879, from the Union Theological Seminary in 1882, studied also in Berlin and Göttingen, and was a pastor in

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Omaha and Chicago. In 1898 he became professor of theology in the Union Seminary. Among his works are: 'The Power of an Endless Life' (1893); 'The Social Significance of the Evangelical Revival in England' (1899); and 'The Synoptic Gospels' (1900).

Hall-marks. See **PLATE-MARKS.**

Hall of Fame, a memorial to famous Americans, at the New York University. The institution received a gift of \$100,000 with which it built a colonnade 500 feet long on University Heights, a beautiful site in upper New York, overlooking the valleys of the Harlem and the Hudson. Large panels to the number of 150, two feet by eight, will bear simple inscriptions of the names and dates of birth and death of the famous native Americans who are chosen as the 150 greatest men. Of these, 29 were chosen in 1900, 11 in 1905 and 11 in 1910. The public was invited to make nominations; and such nominations as were seconded by the Senate of the University were submitted to 100 judges, representing every State in the Union. These judges were university and college presidents, professors of history, scientists, publicists, editors, authors, and judges of the supreme court, national and state. Ninety-seven of these sent in their votes, and 29 great men, native and 10 years dead, chosen by this vote, and thereafter ratified by the Senate of the University, were the first of these immortals.

The 29 candidates elected on the first ballot (1900) and the number of votes received were as follows: George Washington, 97; Abraham Lincoln, 96; Daniel Webster, 96; Benjamin Franklin, 94; Ulysses S. Grant, 92; John Marshall, 91; Thomas Jefferson, 90; Ralph Waldo Emerson, 87; Henry Wadsworth Longfellow, 85; Robert Fulton, 85; Washington Irving, 83; Jonathan Edwards, 81; Samuel F. B. Morse, 80; David Glasgow Farragut, 79; Henry Clay, 74; Nathaniel Hawthorne, 73; George Peabody, 72; Robert E. Lee, 69; Peter Cooper, 69; Eli Whitney, 67; John James Audubon, 67; Horace Mann, 67; Henry Ward Beecher, 66; James Kent, 65; Joseph Story, 64; John Adams, 61; William Ellery Channing, 58; Gilbert Stuart, 52; Asa Gray, 51. The names of Bryant, Poe, and Cooper were certain of election later. Lowell was not yet dead ten years, so was not eligible. Bryant failed by 3 votes, Greeley by 5, Motley by 9. The most animated discussion was provoked by the selection of Robert E. Lee. The vote for him was not sectional, however, only a minority of the electors being Southern men.

In Oct. 1905, under the rules, the University Senate received the ballots of 95 electors out of 101 appointed. Of these only 85 undertook to consider the names of women. A majority of 51 was demanded, but in the case of the names of women, a majority of only 47. The following persons were elected: John Quincy Adams, 59; James Russell Lowell, 58; William Tecumseh Sherman, 58; James Madison, 56; John Greenleaf Whittier, 53; Alexander Hamilton, 53; Louis Agassiz, 53; John Paul Jones, 54; Mary Lyon, 58; Emma Willard, 50; Maria Mitchell, 48. Among the names which received less than a majority vote in the 1905 election were those of Oliver

Wendell Holmes, 48; Phillips Brooks, 48; Bryant, Parkman and Motley, 46 each; Poe and Cooper, 43 each; Bancroft and Greeley, 39 each; Nathaniel Green and Mark Hopkins, 38 each; Joseph Henry, 32; Rufus Choate, 31. On 30 May 1907, the 11 new tablets were unveiled, orations being delivered by the Governors of New York and Massachusetts.

The third quinquennial election was held in 1910, when 11 new names were again added to as many tablets. They brought the total number to 51. Ninety-seven out of a possible 100 votes were cast by the board of electors, the number required to elect being, as in 1905, 51. The ballots of 1 professor of history, 1 publicist, and 1 Chief Justice on the board of electors were not received. The persons selected were: Harriet Beecher Stowe, 71; Oliver Wendell Holmes, 69; Edgar Allan Poe, 69; Roger Williams, 64; James Fenimore Cooper, 62; Phillips Brooks, 60; William Cullen Bryant, 59; Frances E. Willard, 56; Andrew Jackson, 53; George Bancroft, 53; John Lothrop Motley, 51. Those failing of election by less than 10 votes were: Samuel Adams, 41 votes; Daniel Boone, 42; Patrick Henry, 44; Mark Hopkins, 45; Francis Parkman, 45; Charlotte Saunders Cushman, 45; Lucretia Mott, 41; Martha Washington, 43.

Hall of Odin, a tradition among the Scandinavian peoples, which tells of the rocks from which the Berserkers, when tired of life, flung themselves into the sea; so named because they were regarded as the portals of the Scandinavian Valhalla.

Hallam, hāl'am, **Arthur Henry**, English essayist: b. London 1 Feb. 1811; d. Vienna 15 Sept. 1833. He was a son of Henry Hallam (q.v.), and was graduated in 1832 from Trinity College, Cambridge, entered the Inner Temple and later the office of a conveyancer of Lincoln's Inn; and died during a visit to the Continent. At Cambridge he met Alfred Tennyson, whose 'In Memoriam,' through which he is best known, employs his sudden and untimely death as a basis for the exposition of a poet's philosophy. His 'Remains in Prose and Verse' (1834), largely justify the high hopes entertained for him, especially in the critique of Rossetti's 'Disquisizione sullo spirito anti-papale,' and the essay on Cicero.

Hallam, Henry, English historian: b. Windsor 9 July 1777; d. Penshurst, Kent, 21 Jan. 1859. He was educated at Oxford, and in 1818 made his appearance as an author by his 'View of the State of Europe during the Middle Ages,' which at once established his reputation, and is acknowledged as a standard work. His next work, the 'Constitutional History of England' (1827), is justly regarded as a model at once of laborious research and scrupulous impartiality—an impartiality so scrupulous, that his readers are sometimes perplexed to discover to which side his judgment inclines. His 'Introduction to the Literature of Europe' (1837-9), if it could not add to his reputation, certainly did not detract from it. His eldest son, Arthur Henry (q.v.), died in early manhood; the great hopes buried with him may be gathered from a most affecting 'Mémorial' printed by his father for private circulation, while Tennyson's

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'In Memoriam,' of which Arthur Hallam is the subject, has raised to him a durable monument.

Hallé, hăl-lă, Sir Charles, Anglo-German pianist: b. Hagen, Westphalia, 11 April 1819; d. Manchester, England, 25 Oct. 1895. He studied first at Darmstadt, and afterward at Paris, where his reputation was established by his concerts of classical music. But the revolution of 1848 sent him to England, and he made his home in Manchester. There he established in 1857 a series of subscription orchestral concerts which did much to raise the popular standard of musical taste by familiarizing the British public with the great masters of classical music. The orchestra which he conducted some forty years was the most finely trained body of musicians in the United Kingdom. He was knighted in 1888, and married the same year the famous violinist, Madame Norman-Neruda.

Hallé, Wilma Maria Francesca Neruda, Lady, Austrian violinist: b. Brunn, Moravia, 1840. She made her debut at Vienna in 1846, exciting the greatest enthusiasm by her wonderful execution. Her first husband was a Swedish musician, Ludwig Norman, and as Madame Norman-Neruda she was famous in England and America long before her marriage to Sir Charles Hallé (q.v.) in 1888. After the death of the latter she visited the United States on a concert tour.

Halle, hăl'lě, or Halle an der Saale, än-děr-ză'lě, Germany, a town and important railway junction of six lines, in Prussian Saxony, about 20 miles northwest of Leipsic, on the river Saale. It consists of the mediæval town with narrow, crooked streets and ancient dwellings, separated by boulevards on the site of the old ramparts, from extensive and handsome suburbs. Among notable public buildings are the restored mediæval Rathaus; the "Red Tower" in the market place, a 15th century clock-tower; the decaying Moritzburg, formerly a citadel and archiepiscopal residence; the modern Gothic Ratskeller; the extensive buildings of the University (q.v.); a deaf and dumb asylum; a lunatic asylum; the 12th century Moritzkirche with fine wood carvings; the 16th century Protestant cathedral; and the 16th century Gothic church of the Virgin, with four towers and noted for its handsome interior. In the suburb of Glaucha the Waisenhaus, "orphan house," or institution founded by the Rev. Francke about 1693 forms a small town in itself. Besides the orphan asylum it includes different grade schools, attended by between 3,000 and 4,000 pupils; a printing and publishing establishment; and a laboratory where medicines are prepared and sold. The trade and manufactures of Halle are extensive. The latter include starch, beet-root sugar, chemicals, oil, machinery, etc., besides the celebrated ancient salt works. The salt workers form a distinctive colony with special exemptions and privileges and are known as "Hallören." Halle is mentioned as Halla as early as 806; in the 12th century it had developed considerable trade, and in the next two centuries was an important member of the Hanseatic League. In 1806 it was taken by the French; in 1813 it was annexed to Prussia.

Halle, University of, Germany, a celebrated institution founded in 1694 by King Fred-

erick I. in the interests of the jurist Thomasius, when he was followed to Halle by several students after his retirement from Leipsic owing to the envy of his fellow professors. It attained a high degree of prosperity, but owing to its strong Prussian proclivities was suppressed by Napoleon in 1806 and in 1813. It was re-established in 1815 and in 1817 was united with the University of Wittenberg. Its buildings which are very extensive, especially those accommodating the medical faculty, date from 1832. There are faculties of theology, law, medicine, and philosophy. From its foundation Halle was recognized as one of the principal schools of Protestant theology, and has numbered among its professors some of the most eminent names of Germany. Connected with the university is an ever-increasing library of over 220,000 volumes and MSS., a medical and surgical clinical institute; a maternity hospital; an observatory; a theological and normal seminary; and a botanical garden; especial attention is devoted to agriculture. In 1903 the university had nearly 2,000 students.

Halleck, hăl'ěk, Fitz-Greene, American poet: b. Guilford, Conn., 8 July 1790; d. there 19 Nov. 1867. At 18 he became a clerk in a New York bank, in which employment he remained for 20 years. For a long period after this he was the confidential agent of John Jacob Astor, and was named by him one of the original trustees of the Astor Library. In 1849 he retired to his native town. He wrote verses in his boyhood, but these early effusions were excluded from the collected editions of his poems. In 1819 he assisted Joseph Rodman Drake (q.v.) in the humorous series of 'Croaker' papers, contributed to the *New York Evening Post*. Drake's death in the succeeding year was commemorated by Halleck in a most touching poem. In 1819 was published Halleck's longest poem, 'Fanny,' a satire, in the measure of Byron's 'Don Juan,' on the fashions, follies, and public characters of the day. From the variety and pungency of the local and personal allusions it enjoyed a great but fleeting popularity. In 1827 he published an edition of his poems in one volume, two of the best in the collection, 'Alnwick Castle' and 'Burns,' having been suggested by scenes and incidents of foreign travel. This edition also included the spirited lyric, 'Marco Bozzaris,' by which he will probably be longest kept in mind. Consult Wilson, 'Life and Letters of Fitz-Greene Halleck' (1869).

Halleck, Henry Wager, American soldier: b. Westernville, N. Y., 16 Jan. 1815; d. Louisville, Ky., 9 Jan. 1872. He was graduated at the United States Military Academy in 1830, was assistant to the Board of Engineers at Washington 1840-1, and in 1841-6 assistant engineer in the repair of the New York harbor fortifications. In the Mexican War he was on the Pacific coast, and in 1847-9 was secretary of State for California under the military government. After service as inspector and engineer of lighthouses (1852-4) and as engineer of the board for fortifications on the Pacific coast (1853-4), he resigned from the service in 1854, and practised law in San Francisco. On the outbreak of the Civil War he re-entered the army, and in November 1861, was appointed commander of the department of the Missouri.

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then in a state of thorough disorganization. He quickly reduced the department to order, outlined the western campaign of 1862, directed this campaign in person from 11 April, and took Corinth, with its 15 miles of entrenchments, on 30 May. In July he became general-in-chief of the armies of the United States; and henceforth directed from Washington the movements of the generals in the field, till, in March 1864, he was superseded by Gen. Grant. Halleck was chief of staff till 1865, commanded the military division of the James in 1865, that of the Pacific, 1865-9, and that of the South from 1869 until his death. He wrote a work on 'The Elements of Military Art and Science' (1846), largely used as a manual in the Civil War; 'Bitumen' (1841); 'A Collection of Mining Laws of Spain and Mexico' (1859), and other volumes.

Halleck, Reuben Post, American educator: b. Rocky Point, L. I., 8 Feb. 1859. He was graduated from Yale in 1881, was instructor in the Male High School, Louisville, Ky., 1883-96, and principal from the latter date. He has published: 'Psychology and Psychic Culture' (1895); 'The Education of the Central Nervous System' (1890); 'History of English Literature' (1900).

Hallelujah, hăl-e-loo'ya, **Halleluia**, or **Alleluia** (Hebrew), "Praise ye the Lord"; an expression which occurs often in the Psalms, and which was retained when the Bible was translated into the various languages, probably on account of its full and fine sound, which, together with its simple and solemn meaning, so proper for public religious services, has rendered it a favorite of musical composers. The Roman Catholic Church does not allow it to be sung on the Sundays during Lent, on account of the mournful solemnity of the season; and in that church it is not sung again before Easter. It is no longer sung in masses for the dead as formerly. In the time of Augustine the African Church used this doxology only from Easter to the feast of Pentecost. The Greeks made an earlier or more common use of the Hallelujah than the Latin Church. The Jews call the Psalms cxiii.-cxvii. the Great Hallelujah, because they celebrate the particular mercies of God toward the Jews, and they are sung on the feast of the Passover, and on the feast of Tabernacles.

Haller, Albrecht von, äl'brēnt fōn hăl'lēr, Swiss anatomist, botanist and poet: b. Bern 16 Oct. 1708; d. there 12 Dec. 1777. Having chosen the medical profession, he went to the University of Tübingen, where he studied comparative anatomy under Duvernoy; and in 1725 removed to Leyden, then the first medical school in Europe. After extensive travels in England and France he went to Basel in 1828 to study mathematics under Bernoulli. Here he first imbibed a taste for botany, and composed his poem 'Die Alpen', followed by various ethical epistles and other pieces, which gave him a reputation in Germany. In 1729 he returned to his native city, and entered on his professional career as a public lecturer on anatomy. In 1736 he became professor of anatomy, surgery, and botany, in the newly founded University of Göttingen, and through his influence the university was enriched with a botanical garden, an anatomical theatre, a school for midwifery, and a college of surgery. In 1747 appeared the first edition of his 'Primæ Lineæ

Physiologiæ,' which, long after the death of the author, was used as a text-book in schools of medicine. In 1752 he first advanced his opinions on the properties of sensibility and irritability as existing in the nervous and muscular fibres of animal bodies; doctrines which attracted much attention, and excited great controversies in the medical world. Disagreements with his colleagues induced him to return, in 1753, to Bern, where his countrymen received him with the respect due to his fame and talents. Having been elected a member of the sovereign council of the state, he soon obtained by lot one of its magistracies, and entered with zeal on the duties of a citizen, though he did not neglect his scientific pursuits. He was elected in 1754 one of the foreign associates of the Paris Academy of Sciences. In 1758 he became director of the public salt-works at Bex and Aigle, and in the course of his superintendence introduced many improvements in the manufacture of salt. His later published works include: 'Elementa Physiologiæ Corporis Humani' (1757-66); 'Bibliotheca Botanica' (1771); 'Bibliotheca Anatomica' (1774); 'Bibliotheca Chirurgica' (1774); 'Bibliotheca Medicinæ Practicæ' (1776-88).

Haller is considered one of the greatest German poets of the 18th century. His philosophical and descriptive poems display depth of thought and richness of imagination. His 'Elegiac Poems' (Die elegischen Gedichte) are still frequently republished in Germany. He wrote in prose three philosophico-political romances — 'Usona', 'Alfred the Great,' and 'Fabius and Cato' — designed to exhibit the respective advantages of different forms of government, and corresponded in German, Latin, Italian, English, and French with all parts of Europe.

Hallett, Benjamin Franklin, American statesman: b. Barnstable, Mass., 2 Dec. 1797; d. Boston 30 Sept. 1862. Graduated from Brown University in 1816, he studied law, was admitted to the bar, and was connected with the Providence (R. I.) press, but later went to Boston, and there became editor of the Boston *Advocate*, the official mouthpiece of the Anti-Masonic party. From 1827 to 1831 he edited the Boston *Daily Advertiser*, which he made extremely unpopular through his vigorous enunciation of his views on masonry, temperance, and emancipation. He afterward became a Democrat and an influential factor in his party. For years he was chairman of its national committee, and it was he who drafted the Cincinnati platform of 1856. President Pierce, whose nomination he had helped to secure, appointed him United States district attorney in 1853.

Hallettsville, Texas, city, county-seat of Lavaca County; on the San Antonio & A. P. railroad; about 100 miles southwest of Houston. It is in an agricultural and stock-raising region, and special attention is given to cotton and cattle. It has a cotton-seed oil mill and a number of cotton-gins. Large shipments are made each year of live-stock, cotton, and cotton-seed oil. Pop. (1910) 1,379.

Halley, hăl'ī, Edmund, English mathematician and astronomer: b. Haggerston, near London, 29 Oct. 1656; d. Greenwich, Kent, 1742. Before he was 19 he published 'A Direct and Geometrical Method of Finding the Aphelia and

Eccentricity of Planets,' which supplied a defect in the Keplerian theory of planetary motion. By some observations on a spot which appeared on the sun's disk in July and August 1676, he established the certainty of the motion of the sun round its own axis. August 21, the same year, he fixed the longitude of the Cape of Good Hope by his observation of the occultation of Mars by the moon. In 1679 he published 'Catalogus Stellarum Australium, sive Supplementum Catalogi Tycho-nici,' etc., and in 1683 his 'Theory of the Variation of the Magnetical Compass,' in which he endeavors to account for that phenomenon by the supposition of the whole globe of the earth being one great magnet, having four circulating magnetical poles or points of attraction. For the purpose of making further observations relative to the variation of the compass he set sail on a voyage in 1699, and having traversed both hemispheres arrived in England in September 1700. The spot at St. Helena where he erected a tent for making astronomical observations is still called Halley's Mount. As the result of his researches he published a general chart, showing at one view the variation of the compass in all those seas with which English navigators were acquainted. He was next employed to observe the course of the tides in the English Channel, with the longitudes and latitudes of the principal headlands, in consequence of which he published a large map of the channel. In 1703 he was elected Savilian professor of geometry at Oxford, and in 1720 he received the appointment of astronomer-royal at Greenwich, where he afterward resided, devoting his time to completing the theory of the motion of the moon. In 1721 he began his observations, and for the space of 18 years scarcely ever missed taking a meridian view of the moon, when the weather was not unfavorable. In 1752 appeared his 'Astronomical Tables,' and he was the author of a great number of papers in the 'Philosophical Transactions.' For the comet called by his name, see COMET.

Halliwel-Phillipps, hăl'ī-wěl-fil'ps, James Orchard, English antiquary and Shakespearian scholar: b. Chelsea, London, 21 June 1820; d. Hollingsbury Copse, near Brighton, 3 Jan. 1889. He was educated at Cambridge. In 1839 he was elected Fellow of the Royal and Antiquarian Societies. Gradually he came to concentrate his studies on Shakespeare alone, and more particularly on the facts of the poet's life, discrediting the internal evidence of the plays and sonnets, and devoting his attention to a minute and patient study of local tradition and the records of 32 towns besides Stratford. The successive editions of his 'Outlines of the Life of Shakespeare' (1848; 8th ed. 1889) recorded the growing results of his discoveries. Apart from Shakespeare, his 'Nursery Rhymes and Nursery Tales of England' (1845), and 'Dictionary of Archaic and Provincial Words' (1847; 6th ed. 1868) will keep his name from being forgotten. His magnificent folio edition of the 'Works of Shakespeare,' probably the richest storehouse extant of Shakespearian criticism (1853-65), was published at a price prohibitive to most students. To the Smithsonian Institute he gave (1852) a collection of accounts, inventories, and bills illustrative

of the history of prices current in the years 1650-1750.

Hallock, Charles, American journalist and author: b. New York 13 March 1834. He was graduated from Amherst in 1854, was editor of the New Haven Register in 1855-6, of the New York Journal of Commerce in 1856-61, of the St. John (N. B.) Telegraph and Courier in 1863-5. In 1873 he founded 'Forest and Stream,' and in 1896-7 was editor of the 'Northwestern Field and Stream.' In 1874 he founded the International Society for the Protection of Game. He did field-work and collecting for the Smithsonian Institution, and published numerous works, such as: 'The Fishing Tourist' (1873); 'Camp Life in Florida' (1876); 'Vacation Rambles in Michigan' (1877); 'Dog Fanciers' Directory' (1886); 'The Salmon Fisher' (1890). He was a son of Gerard Hallock (q.v.).

Hallock, Gerard, American journalist: b. Pittsfield, Mass., 18 March 1800; d. New Haven, Conn., 4 Jan. 1866. He was graduated from Williams College in 1819, in 1824 founded the Boston Telegraph (united with the Recorder in 1825), in 1827 purchased a part interest in the New York Observer, and in 1828 became associated with David Hale on the Journal of Commerce. A leader in journalistic enterprise, he started (1833) a pony-express between Philadelphia and New York, and operated the Evening Edition, a schooner which met incoming ships at Sandy Hook, and brought foreign news. A pro-slavery man, he was a founder of the Southern Aid Society (1854), intended to succeed the American Home Missionary Society when the latter refused support to slave-holding congregations. In 1861 the Journal of Commerce was forbidden the use of the United States mails, and Hallock thereupon sold his interest, and never afterward wrote for the press. He was a founder of the Associated Press.

Hallock, Joseph Newton, American Presbyterian clergyman and religious journalist: b. Franklinville, N. Y., 1834. He was graduated from Yale in 1857 and from the Yale Theological Seminary in 1860, and after holding pastorates of several Presbyterian churches became editor and proprietor of 'The Christian at Work.' Among other works he has published 'The Christian Life' (1890); 'Family Worship' (1892); 'What is Heresy?' (1894); 'Mormonism' (1896); 'Life of D. L. Moody' (q.v.) (1900).

Hallowe'en, hăl-ō-ēn', or **Hallow-Even**, the evening of 31 October, so called as being the eve or vigil of All Hallows, or festival of All Saints, which falls on 1 November. It is associated in the popular imagination with the prevalence of supernatural influences, and is clearly a relic of pagan times. In the north of England, hallowe'en is known as Nutcrack Night. In Scotland the ceremonies of the eve were formerly regarded in a highly superstitious light, and Burns' 'Hallowe'en' gives a humorous and richly imaginative presentment of the usual ceremonies as practised in Scottish rural districts in his day. The principal object of curiosity in consulting the future was to discover who should be the partner in life. Popular belief ascribed to children born on hallowe'en the faculty of perceiving and holding converse with supernatural beings.

HALLOWELL — HALPINE

Hal'lowell, Richard Price, American author and wool merchant: b. Philadelphia 16 Dec. 1835; d. Medford, Mass., 5 Jan. 1904. He was prominent in the abolition movement, was appointed by Gov. Andrew of Massachusetts special agent to recruit negro regiments, and subsequently was vice-president of the New England Woman Suffrage Association. He published 'The Quaker Invasion of Massachusetts' (1883), etc.

Hallowell, Me., city in Kennebec County, on the Kennebec River, and on the Maine Central railroad; two miles south of Augusta and four miles north of Gardiner. The first permanent settlement was made in 1754. It was incorporated as a township in 1771, and chartered as a city 29 Aug. 1850. At the time of its becoming a chartered city it included within its limits Chelsea, Manchester, and Farmingdale. The city is governed by a mayor and a council of seven members elected annually. It has two banks with a combined capital of \$150,000. The industries of the city include granite works, shoe manufactories, glue works, cotton goods, machinery, etc. The Hubbard Free Library and the Maine Industrial School are public institutions. Pop. (1910) 2,864.

Hall'statt Epoch, a name taken from the necropolis of Hallstatt, Upper Austria, not far from Salzburg, and applied to that culture in Europe—parts of Germany, France, Italy, and in Switzerland, Bohemia, etc.—distinguished as the last bronze and first iron stage, dating back at least as far as 1000 B.C. According to some ethnologists in the eastern highlands of the Alps this culture was of a higher evolution than that of a partially Oriental cast in the west during the Neolithic epoch.

Hällström, Ivar, *ä'vär hël'strém*, Swedish composer: b. Stockholm 5 June 1826; d. there 11 April 1901. He studied law at Upsala, then turned his attention to music, in 1861-72 was director of the institute founded by Lindblad, and from 1881 instructor to the Royal Opera. His works include the operas 'Den Bergagna' ('The Mountain King' 1874); and 'Neaga' (libretto by Carmen Sylva, 1885); cantatas, numerous songs, and an 'Idyle' for orchestra, chorus, and solo voices, for which he received (1860) a prize from the Stockholm Musical Union.

Hallucina'tions, are morbid conditions of mind in which the patient is conscious of a perception without any impression having been made on the external organs of sense. Hallucinations are to be distinguished from delusions, for in these there are real sensations, though they are erroneously interpreted. All the senses are not equally subject to hallucinations; the most frequent are those of hearing; next, according to many, come those of sight, smell, touch, and taste; and hallucinations of several senses may exist simultaneously in the same individual. They may also be complicated with certain delusions. Often even the hallucination of one sense is confirmed by the delusion of another, so that it is neither possible nor necessary always to distinguish hallucinations from delusions. The simplest form of hallucinations of hearing is the tingling of the ears; but the striking of clocks, the sounds of musical instruments and of the human voice are often heard,

and in these instances, as in those of the perturbations of the other senses, there must be a diseased sensorium, though there should be no structural derangement of the nerves. Hallucinations are not confined to those whose mental faculties have been alienated, but occasionally assail and torment even the sane. The second Earl Grey was haunted by a gory head, but he could dismiss it at will. Swedenborg had a similar faculty; and Bernadotte, king of Sweden, was besieged in his rides by a woman in a red cloak, being perfectly conscious of the hallucination under which he labored. Lord Brougham proposed that the existence of hallucinations should be established as an authoritative test for the existence of insanity; but, as will have been seen, this would be no test at all. The proportion of the hallucinations of the various senses has been by some tabulated thus:—hearing, 49; vision, 48; taste, 8; touch, 3; smell, 1. All are more frequent in mania than in monomania, and in mania errors of vision are more numerous than those of hearing. See APPARITIONS; DREAMS; GHOSTS; INSANITY.

Hallux Valgus, a deformity of the great toe consisting of a turning of the toe toward its neighbor, with a marked enlargement of the head of the bone. The synovial sac on the inner side of the toe is often chronically inflamed from constant pressure, forming a bunion. Advanced cases may require the excision of the bony outgrowths, but early cases may be relieved by a properly adjusted shoe.

Halmahera, *hāl-mā-hā'rā*. See GILOLO.

Halo, the name given to colored circles sometimes seen around the sun or moon, and to other connected luminous appearances. Sometimes as many as three circles are seen round the sun. A white band across the sun, parallel to the horizon, is also sometimes seen; and sometimes a second white band, perpendicular to the first. These bands form a cross, and stretch out so as to cut the circles of the halo. It is on these bands that parhelia or mock suns are formed. The explanation of halos is complex and difficult. Mariotte attributed the colored rings to refraction of light through small crystals of ice in the air, and calculation appears to confirm his hypothesis. The third circle is probably due to refraction of light that has undergone internal reflection in the crystals in a way similar to that which occurs in the formation of the rainbow. On the other hand, the white bands crossing the sun must be due to reflection of light from the surfaces of the crystals. See LIGHT; PARHELION; SUN.

Halogen, *hāl'ō-jën*, in chemistry, an element, or inorganic radical, which unites directly with a metal to produce a saline substance, such as common salt. The term is usually confined to the elements fluorin, chlorin, bromin, and iodine, and the compound known as cyanogen.

Halophytes, *hāl'ō-fits*, a group of plants considered with reference to their habitat, and including those which inhabit salt marshes, and by combustion yield barilla, as *Salsola*, *Salicornia*, and *Chenopodium*. For further examples see BEACH-PLANTS and DESERT PLANTS.

Hal'pine, or **Halpin**, **Charles Graham**, American soldier and author: b. Oldcastle, County Meath, Ireland, 20 Nov. 1829; d. New York

3 Aug. 1868. After study at Trinity College, Dublin, he came to Boston, Mass., in 1851, was there assistant editor of the *Post*, and with B. P. Shillaber began the 'Carpet Bag,' an unsuccessful humorous periodical. Later Washington correspondent of the *New York Times*, he then went to New York, where he was connected with the *Herald*, and wrote much ephemeral matter for magazines. Upon the outbreak of the Civil War he enlisted in the 69th New York volunteer infantry, and was afterward on the staff of Hunter as assistant adjutant-general, of Gen. Halleck with the rank of colonel. In 1864 he resigned from the service and was brevetted brigadier-general of volunteers. He was best known for his burlesque verses, written in the character of an Irish private, 'MILES O'REILLY,' over which pseudonym they appeared. 'Life and Adventures, Songs, Services, and Speeches' was published in 1864, and his complete 'Poetical Works' in 1869.

Hals, häls, Frana, Dutch painter: b. Anwerp about 1584; d. Haarlem 7 Sept. 1666. When young he went to Haarlem, where he studied painting under Karel van Mander, and he was one of the civic guard, director of an art school, and chief of the painters' guild. His first dated work is a portrait belonging to the year 1613, his next, the 'Banquet of the Officers of the Haarlem Corps of Arquebusiers of St. George' (1616), one of the earliest pictures belonging to the Dutch school of genre painting, of which Hals is sometimes regarded as the founder. He executed 'The Jolly Trio,' 'Herring Vender,' and 'Fool Playing a Lute,' and seems to have found in genre painting a scope and a possibility of humor much to his taste. He executed also many single-figure pieces, as 'Hille Bobbe' (National Gallery, Berlin; replica in the Metropolitan Museum), and numerous portraits, all of high value artistically. Hals is ranked among the foremost of portrait artists, being notably successful in illuminating the character of the face. Adrian van Ostade, Wouwerman, and Adrian Brouwer were among his pupils. He is said to have been improvident in his habits, and latterly received a pension from the municipality of Haarlem. His brother DIRK, d. Haarlem May 1656, and his son, FRANS HALS, THE YOUNGER, b. about 1620; d. about 1669, were also excellent painters.

Hal'sey, Francis Whiting, American journalist: b. Unadilla, N. Y., 15 Oct. 1851. He was a member of the editorial staff of the *New York Tribune* 1875-80, and was attached to that of the *New York Times* 1880-1902, editing the *Times* 'Saturday Review' from 1896. He has published 'Two Months Abroad' (1878); 'The Old New York Frontier' (1901); 'American Authors and their Homes'; 'Essays'; 'Our Literary Deluge' (1902).

Hal'stead, Murat, American journalist: b. Ross, Butler County, Ohio, 2 Sept. 1829; d. Cincinnati, O., 2 July 1908. At 18 he began writing for newspapers, studied at Farmers' College, near Cincinnati, and did local newspaper reporting on several Cincinnati papers. In 1853 he became manager of a department on the Cincinnati *Commercial*. The following year he acquired a pecuniary interest in the paper, which began rapidly to increase in circulation and influence. The *Commercial*

combining with the *Gazette*, its rival, the Cincinnati *Commercial-Gazette*, became the recognized organ of the Ohio Republicans. In 1890 he removed to Brooklyn, N. Y., where he edited the *Standard Union*. Later he was a contributor to magazines and as a special correspondent went to the Philippines during the Spanish-American War. He wrote: 'The Story of Cuba'; 'Life of William McKinley'; 'The Story of the Philippines'; 'History of American Expansion'; 'Life of Admiral Dewey'; 'The Boer and British War'; 'The War Between Russia and Japan' (1905); etc.

Halsted, George Bruce, American mathematician: b. Newark, N. J., 25 Nov. 1853. He was graduated from Princeton in 1875 and since 1884 has been professor of mathematics in the University of Texas. He has published 'Mensuration' (1881); 'Elements of Geometry' (1885); 'Elementary Synthetic Geometry' (1892); 'Pure Projective Geometry' (1895).

Ham, one of the three sons of Noah, from whom the earth after the Deluge was peopled. He is first mentioned between the other two—Shem, Ham, and Japheth; but afterward is expressly designated the younger son of Noah, that is, relatively to the other two. He had four sons—Cush, Mizraim, Phut, and Canaan. The three first traveled southward, and from them chiefly sprang the tribes that peopled the African continent, as Canaan became the father of the tribes that principally occupied the territory of Phœnicia and Palestine. Ham is also used as a designation of Egypt, probably on account of its population having sprung from a son of Ham, and the name Ammon, by which the chief god of the northern Africans was often called and worshipped, may very likely derive its origin from the same source.

Ham, the joint which unites the thigh and the leg of an animal, but more generally understood to mean the cured thigh of the hog. Ham-curing is now an important branch of business, especially in Great Britain and America, and the details of the process are generally the same everywhere. The meat is first well rubbed with salt, and a few days after it is rubbed again with a mixture of salt, saltpetre, and sugar, though sometimes the saltpetre is omitted. After lying in the tub for eight or ten days it is ready for drying. Wet-salting requires three weeks, and dry-salting four. The smoking of hams is carried on in smoke-houses, the meat being hung as high as possible, and subjected to the smoke of a fire kindled on the ground-flat, and which ascends through holes in the flooring. The process of smoking is for the most part carried on in winter, the fire being kept in a smouldering state for five or six weeks. Wood is used in preference to coal in the process of smoking. See **PORK**.

Ham-beetle, or **Paper-worm**, a small clerid beetle (*Necrobia rufipes*), sometimes a pest of considerable importance because of the occurrence of its larvæ or "worms," the paper-like cocoons and beetles on hams in such numbers as to render them unmerchable. Its injuries are generally confined to the exterior and are due to carelessness in packing and to the cracking of the ham coverings. This is one of three cosmopolitan species of the same genus, all of which are carnivorous scavengers.

Ham-fly, a name of the cheese-fly (q.v.), due to the occasional appearance of its maggots or "skippers" in the fatty exterior portions of preserved hams.

Hama, hā'mā, or **Hamah**, Syria, the Biblical HAMATH, a very ancient city, on the El-Asi (Orontes), 110 miles northeast of Damascus. It is surrounded by gardens, and has narrow, crooked streets, with houses built of timber, and sun-dried bricks. There are manufactures of yarn and coarse woolens, and a general domestic and caravan trade. Hamath is frequently mentioned in Old Testament history as in conflict with the Assyrians; first as early as 854 B.C. After the Græco-Macedonian conquest it became known as Epiphania. In 639 it was captured by the Moslems. Abulfeda, the Arabian geographer, was prince of Hama from 1310-31. In 1812 Burckhardt here discovered the four Hittite stones, the inscriptions of which are still undeciphered. Pop. (est.) 45,000.

Hamadryad, hām'a-dri-ād. (1) A baboon (q.v.). (2) The king-cobra (*Naja bungarus*), one of the Oriental cobras, found from Southern India to China and the Philippines, and closely allied in structure, markings, and habits to the cobra di capello, but much larger, reaching the length sometimes of 13 feet, making it the longest of venomous serpents. It is also the most fierce in disposition, but fortunately is nowhere common, and feeds wholly on other snakes. Consult Fayrer, 'Thanatophidia of India' (1874).

Hamadryads, in Greek mythology, the eight daughters of Hamadryas. They received their names from trees, and are the same as the Dryads (q.v.). They were conceived to inhabit each a particular tree, with which they were born, and with which they perished.

Hamame'lis. See WITCH HAZEL.

Haman, hā'man, a minister of the Persian king Ahasuerus. Because Mordecai the Jew refused to pay him homage, he resolved on the destruction of all the Jews in the Persian monarchy. By falsehood and intrigue he succeeded in obtaining a decree for this purpose; but Esther, the Jewish consort of Ahasuerus, interposed for their deliverance, and Haman was hanged on the very gibbet he had caused to be prepared for Mordecai. His history is contained in the book of Esther.

Hamath, hā'māth. See HAMA.

Hām'blin, Joseph Eldridge, American soldier: b. Yarmouth, Mass., 1828; d. New York 3 July 1870. Not long after the commencement of the Civil War, he became adjutant of the 5th New York, later was transferred to the 65th, whose commander he soon became, and with which he participated in Sheridan's victorious movements in the Shenandoah. For services at Cedar Creek he was brevetted brigadier-general, and was mustered out in 1866 with full rank of brigadier and brevet of major-general. Subsequently he was active in the affairs of the New York State National Guard.

Hamblin, Thomas Sowerby, American actor: b. Pentonville, near London, England, 14 May 1800; d. New York 8 Jan. 1853. He was early a member of the corps of the Sadler's Wells and Drury Lane theatres, was a tragedian at Bath, Brighton, and Dublin, came to the

United States in 1825, appeared at the Park Theatre, New York, and acted in leading American cities. He was manager of several New York theatres, and among his rôles were those of Macbeth, Hamlet, Othello, Rôlla, Pierre, Virginius, and Coriolanus. He was esteemed second only to Forrest and the elder Booth, and made the standard drama a feature of his management, under which the Bowery Theatre saw its historic days.

Hamburg, hām'bërg (Ger. hām'boorg), Germany, a free city and state of northwestern Germany, the city occupying 30 square miles of the state's total area of 157.18 square miles. The city is the greatest commercial port on the European continent, the chief of the three Hanse towns, and the seat of the upper Hanseatic court. It is situated at the junction of the Alster and the Bille, on the right bank of the northern branch of the Elbe, about 93 miles from the North Sea. With its connecting suburbs Altona and Ottensen it has a river frontage of over five miles. The river is spanned by two fine bridges, and there are numerous bridges across the canals which intersect the east and lower part of the city in all directions, and across the Alster which flows through the city and forms two ornamental pieces of water, the Aussen-Alster and the Binnen-Alster or Alster-Bassin. The latter is surrounded by fine quays, the Alter Jungfernstieg and the Neuer Jungfernstieg, lined with handsome residences, hotels, and stores, and constituting the chief thoroughfare in the city. The harbor accommodation is extensive; the principal quays along the Elbe where the ocean steamships lie are the Kaiser-Quai and the Sandthor-Quai. The boulevards or Anlagen occupy the site of the ancient encircling walls, removed since 1815. The modern portion of the city, rebuilt since the destructive fire of 1842 in a magnificent and expensive style, is in striking contrast to the older low-lying portion, with its back streets, bordered by warehouses, and the meaner class of dwelling houses. The most important public buildings are the Exchange, a noble edifice consisting chiefly of a magnificent hall surrounded by a fine colonnade and containing a large commercial library; the modern Rathaus in Renaissance style, and the Deutsches Schauspielhaus. Among ecclesiastical structures are the 19th century Gothic church of St. Nicholas with a tower and spire 473 feet high; the 18th century Renaissance church of Saint Michael's, with a spire 426 feet high, the 15th century church of St. Catherine's, the 14th century church of St. James, and a fine Jewish synagogue. Besides the numerous private and public schools the educational institutions include the Johanneum institution founded in 1528, containing a college, museums, and the city's extensive library; the Kunsthalle with a large art collection; and zoological and botanical gardens, etc. Among the many charitable and benevolent institutions are well endowed hospitals, orphan, and insane asylums, and there is also an organized system of municipal poor relief. The sewerage system has been modernized, and the general sanitary conditions improved, especially since the severe choleraic epidemic of 1892. The municipal waterworks, dating from 1531, have been added to at various dates and a modern filtering plant installed since 1893; municipal

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bath and wash houses are maintained; food adulteration is keenly looked after; the gas and electric lighting plants are civic property; and a large revenue is obtained from the electric street railroads, which are operated by private companies, paying state subventions.

The importance of Hamburg is due to its great marine commerce, which has been facilitated by the engineering enterprises of the inhabitants in deepening the bed of the river, cutting canals, and since 1890 in the construction at Cuxhaven, at the mouth of the river, of enormous docks. Seven railroad lines enter the city, which is connected also by rivers and canals with nearly all parts of the German empire. In 1900, 12,912 vessels with a net tonnage of 8,148,218 tons entered, and 14,030 with a net tonnage of 8,293,252 cleared the port. The exports by sea in 1901 amounted approximately to 4,695,469 tons, valued at \$454,886,750; the imports by sea in the same year were approximately 9,701,346 tons, valued at \$540,177,750. Raw materials, foodstuffs, especially coffee, and manufactured articles are the chief imports, the last item constituting also the bulk of the exports. The city's manufacturing interests, though large, are less important, including ship-building, iron-founding, tobacco and cigar making, sugar refining, distilleries, breweries, and numerous other domestic industries. The banking, exchange, and marine assurance business of Hamburg has been on an extensive scale since the establishment of the Hamburg giro-bank in 1619, and is one of the most important in the world.

The city-state has a democratic constitution and is administered by an executive senate of 18 life-members, including a first and a second burgomaster elected biennially among the members, and by the legislative House of Burgesses composed of 160 members elected every six years, one half of whom retire every three years. The population of the city is second to that of Berlin in the German empire; in 1910 it was about 1,000,000.

The city was founded by Charlemagne, who, between 808 and 811, built a citadel and a church on the heights between the Elbe and the east bank of the Alster as a bulwark against the neighboring pagan Slavs. In 831 it became an episcopal see. It was frequently devastated by Danes and Slavs, but in the 12th century had become an important commercial city, and in 1241 and 1249 combined with Lübeck and Bremen in forming the Hanseatic League. It was declared an imperial city by Maximilian in 1510, but was not formally acknowledged until 1618. During the Thirty Years' War its population and prosperity increased owing to the immunity of its position, and in the following century extensive commercial relations with North America were developed. In 1810 it was incorporated in the French empire as the capital of the department of the Mouths of the Elbe, but was occupied by the Russians in 1813. They were driven out by the French under Davoust, two months later, and the city underwent severe financial spoliation at the hands of the conqueror and extensive depopulation. In 1815 it became an independent state of the German federation, forming with Lübeck, Bremen, and Frankfurt, the curia of the free cities. Its trade and importance have increased ever since. In 1871

it united with the German empire as a free city-state; but did not join the Zollverein or German Customs Union until 1888.

Hamburg Fowls. See POULTRY.

Hamilcar, hä-mil'kar, a name of common occurrence at Carthage, and borne by several of its most distinguished citizens, among whom the chief was **HAMILCAR BARCA** ("lightning"): b. Carthage; d. Spain 228 B.C. He was the father of the celebrated Hannibal. While a young man he was appointed to the command of the Carthaginian forces in Sicily, in the 18th year of the first Punic war, 247 B.C. He established himself with his whole army on Mount Hercte (now Monte Pellegrino), where he not only succeeded in maintaining his ground, but sent out squadrons to plunder the coasts of Sicily and Italy. In 244 he quitted his strong position, and, landing at the foot of Mount Eryx, converted the town of that name into a fortified camp for his army. For two years he defied all the efforts of the Romans to dislodge him; but the Carthaginian admiral, Hanno, having been totally defeated off the Ægate Islands, 241 B.C., he reluctantly consented to withdraw from Sicily. His inability to perform the promises which, to keep them in obedience, he had made to his mercenary troops, brought about their revolt after returning from Sicily, and as they were joined by almost all the native Africans, Carthage was brought to the brink of ruin. The incapacity of Hanno, who had been entrusted with the suppression of the revolt, led all parties to concur in the appointment of Hamilcar. He defeated the enemy with great slaughter, reduced their towns to subjection, and after several alternations of fortune, and the appointment of Hanno to a share in the command, the war was brought to a successful close, 238 B.C. Hamilcar now projected the formation of a new empire in Spain, to be a source of strength to Carthage, and the point whence hostilities might be renewed against Rome. This policy was ably prosecuted after his death by Hasdrubal and Hannibal. Hamilcar penetrated into the heart of the country, reduced some cities and tribes, and acquired vast wealth. He passed nine years in Spain, and fell in a battle against the Vettones.

Hamilton, Alexander, American statesman and soldier: b. Charles Town, in the island of Nevis, W. I., 11 Jan. 1757; d. New York 12 July 1804. His parentage is uncertain, but it is generally accepted that he was the son of James Hamilton, a Scotch merchant in Nevis, and Rachel Levine, the daughter of a French physician. Hamilton's father was unfortunate in his business ventures, and having become a bankrupt it was necessary for Alexander, at the age of 12 years, to earn his own living. He secured a position as clerk in the counting-house of Nicholas Cruger of Saint Croix. His "genius for affairs" was soon apparent, and after two years we find him entrusted with the full management of the business. But ambition for something more than a commercial career had already taken hold of the young man's mind, and he began to write for the local press. A very strong and vivid description of a West Indian hurricane, which had devastated the islands, attracted general attention and aroused the lad's friends to provide the necessary funds

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to enable him to come to America to complete his education. He arrived at Boston in 1772, and was put in a school at Elizabethtown, N. J., where he industriously prepared himself for college, and in 1774 he entered King's College (now Columbia University), and made a brilliant record as a student. The friction between England and the American colonies was constantly growing more serious, and after studying the question and being convinced that the colonists were right, Hamilton began the advocacy of their cause in a speech at a public meeting, 6 July 1774. The meeting assembled to discuss the calling of a general congress and was held in the fields (now City Hall Park). He also published two pamphlets, asserting the colonists' position in relation to the Crown and to Parliament, and justifying their appeal to arms. The pamphlets were at first thought to be productions of well-known leaders, and when their authorship became known it gave Hamilton a national reputation. Hamilton now turned his attention to preparation for military service in the Revolution. He secured a commission as captain of the first Continental artillery company and entered the patriot service in March 1776. His natural aptitude for organization and command soon made the company a model of discipline and efficiency. He participated in the battles of Long Island, White Plains, Trenton and Princeton, and won the commendation of his superiors for his skill and courage. On 1 March 1777 Hamilton was appointed lieutenant-colonel and aide-de-camp on the staff of Washington, whose entire confidence he secured, becoming the general's confidential secretary. He took an active part in his chief's battles, assisted in planning campaigns and in devising means for the support of the army, and was entrusted with the important and delicate mission of going to Albany to obtain troops from Gen. Gates (who had previously been ordered to send troops to Washington and had failed to do so) — a duty which Hamilton performed with skill and success. It was while on this mission that he first met Elizabeth Schuyler, the daughter of Gen. Philip Schuyler of New York, whom he afterwards married (14 Dec. 1780). Having received a reprimand from Washington for a supposed delay he took offense and resigned from the staff 16 Feb. 1781. He had no intention, however, of resigning from the Continental Army, and becoming the head of an infantry regiment, he took part in the siege of Yorktown, heading a storming party and capturing one of the strongest British redoubts. The war was now practically ended, and there being no further opportunity for success in the army, Hamilton returned to civil life. He was yet but 24 years old, but by his natural abilities and capacity for leadership he had attained a foremost place among the great men of his day.

The activity of Hamilton's mind is seen in the fact that while still in active military service he found time to study the great questions of government and finance. In a letter to James Duane he clearly set forth his views on the Constitution, that: "Congress should have complete sovereignty in all that relates to war, peace, trade, finance, and to the management of foreign affairs." A letter to Morris on the establishment of a national bank induced him to offer Hamilton the place of receiver-general

of Continental taxes, which he accepted and originated a new system of national taxation. The receiver's office did not prove congenial, and he was relieved of its duties by his election to the Continental Congress from New York 1 Oct. 1782. Congress proved a disappointment. Such were the deplorable conditions then prevailing, the looseness of the Constitution and the financial chaos of the government, that Hamilton's efforts to carry through reforms utterly failed. He resigned from Congress in 1783 and returned to the practice of law in New York, where his melodious voice, dignified deportment and unanswerable logic of reasoning, soon placed him in the highest rank of his profession.

The condition of the States at this time is graphically depicted by Senator Lodge in his 'Life of Hamilton': "Divided among themselves, with no army, no navy, no cohesion, floundering wilfully and helplessly in a sea of unpaid debts and broken promises, bankrupt in money and reputation alike." To secure some relief the Annapolis Convention (q.v.) was held 11 Sept. 1786, five States only being represented — New York, New Jersey, Pennsylvania, Delaware and Virginia. Hamilton was one of the delegates from New York. This convention adopted an address, drafted by Hamilton, reciting the intolerable conditions and calling for a convention to meet the following May in Philadelphia to form a Federal Constitution. (See CONSTITUTION, FRAMING OF THE.) Upon his return to New York he was elected to the State Legislature which convened in January 1787, and began a fight to induce the State to send delegates to the Philadelphia convention. In this he succeeded, and three delegates were appointed, of which Hamilton was one; but the other two were Anti-Federalists, bitterly opposed to Hamilton's idea of a strong general government. When the convention met the vote of his own State was cast against him on every question; the Anti-Federalists withdrew from the convention, leaving New York without a vote. Hamilton, however, presented his views of a plan of government to the convention — an aristocratic republic, with a president and senators chosen for life, and the State governors appointed by the Federal government. After the presentation of this plan, which found no support in the convention, Hamilton withdrew, only returning to engage in the final debates, and at the close he heartily embraced the work of the convention and signed the Constitution as actually adopted.

The Constitution was still to be ratified by the States. New York was opposed to its adoption. There were numerous internal strifes and jealousies, but with great power and determination, Hamilton combated and won over all opponents in the legislature, and by his essays in the 'Federalist,' assisted by Madison and Jay, he successfully fought the great battle for the Constitution, winning a hostile majority to its support. Of these essays George William Curtis declared they "gave birth to American constitutional law, which was thus placed above arbitrary construction and brought into the domain of legal truth."

Washington was inaugurated President in April 1789. In September 1789 Congress passed an act establishing a Treasury Department, and Washington at once made Hamilton the first



ALEXANDER HAMILTON.

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Secretary of the Treasury. His creative, constructive and practical mind was now confronted with the problem of giving to his country a workable system of national administration. With a master's hand he organized the Treasury Department; reduced the confused finances to order; provided for a funded system and a sound system of national taxation; induced Congress to assume the State debts; authorized methods for the establishing of a national bank and a mint, the raising and collection of internal revenue, the management of the public lands, and the purchase of West Point by the government. In 1791 his Report on Industry and Commerce appeared, wherein he discussed with profound ability and clearness the economic problems of his time, and inaugurated, in a very moderate way, the protective tariff system. His methods to strengthen the national government were vigorously opposed by those antagonistic to centralization, chief among whom was Thomas Jefferson (q.v.), and the controversies that then divided parties have been continued by the rival political parties to the present. Engrossed as he was with the home affairs of the government, Hamilton was nevertheless a deep student of foreign relations and advocated a position of strict neutrality on the part of the American government with regard to the difficulties of nations. He ably sustained Washington in his proclamation of strict neutrality between France and England, both in the cabinet and in the public press, and when M. Genêt, the ambassador of the French republic, tried to involve this country in a war with England, Hamilton was vigorous in his condemnation. It was at this time that Jefferson, then Secretary of State, took sides with editor Freneau of the Philadelphia 'National Gazette,' in his criticism of the administration and especially of the treasury department. Hamilton replied and the controversy became typical of the two great political parties—the Federalists and the Republicans. Jefferson's position in the cabinet was most uncomfortable and he resigned 1 Jan. 1794. In 1794 the Whiskey Insurrection (q.v.) occurred in Pennsylvania in opposition to the excise laws passed by Congress. Hamilton advised a vigorous policy and when troops were sent by Washington against the insurgents, Hamilton accompanied them and the "rebellion" quickly faded away.

Desiring to give more attention to his private interests Hamilton resigned from the Cabinet 31 Jan. 1795. He declined the office of Chief Justice of the United States Supreme Court and returned to his law practice in New York city where he was at once acknowledged the leader of the bar. But he still continued to take an active interest in political affairs. In 1794 Chief Justice John Jay (q.v.) was nominated by Washington as envoy extraordinary to negotiate a commercial treaty with Great Britain. With Lord Granville a treaty was drawn up known as Jay's Treaty (q.v.), the terms of which were so hard and unjust that when the treaty was published there was a violent outburst of indignation. Hamilton, however, in a series of essays signed "Camillus," defended the treaty as the best obtainable and after a severe struggle in Congress it was ratified. Washington thoroughly appreciated the judgment and genius of Hamilton, often consulted him on im-

portant matters, and received much help from him in the preparation of his messages and speeches. The "Farewell Address would have been less perfect as a composition," says Renwick, "had it not passed through the hands of Hamilton."

Hamilton had supported John Adams (q.v.) for the Presidency, but Adams was jealous of the power and influence of Hamilton over members of the Cabinet, and made war upon him, expelling his friends from office and assailing him personally. Hamilton blamed Adams for the loss of the elections in New York State, and denounced him bitterly. Adams was renominated in 1800 for the Presidency, but he was beaten by Jefferson, and the Federalist party never won another election. Owing to a defective clause in the Constitution (see JEFFERSON-BURR IMBROGLIO) the election was thrown into the House of Representatives, Jefferson and Burr having received an equal number of votes. Hamilton exerted his great influence with the Federalists and Jefferson was elected.

In 1804 the Federalists nominated Aaron Burr (q.v.) for Governor of the State of New York. The contest was a bitter one and again Hamilton was instrumental in Burr's defeat, and the latter challenged him to a duel on the ground of an alleged insult. Under the idea that the continuance of his personal influence and the peculiar condition in which the affairs of the country were at the time demanded his acceptance of the challenge, he consented to meet Burr, and the duel was fought at Weehawken, N. J., on July 1804. Hamilton was wounded and died the following day, universally mourned by his countrymen.

American history presents no more striking character than Alexander Hamilton. He was not popular, nor did he strive after popularity, but after 100 years his name still holds a noble eminence. He lived for the public good. Eloquent and refined, able and brilliant, the embodiment of devotion, integrity and courage, he has left as deep a mark upon our political institutions as any other statesman our country has produced. Hamilton's works were published by H. C. Lodge in nine volumes (1885-6). Consult: Hamilton, 'History of the Republic of the United States as Traced in the Writings of Alexander Hamilton and His Contemporaries' (4th ed. 1879); Morse, 'Life of Alexander Hamilton' (2 vols. 1876); Lodge, 'Alexander Hamilton' (1882). For his writings, etc., consult 'Bibliotheca Hamiltonia' (1886).

GEORGE EDWIN RINES,

Editorial Staff 'Encyclopedia Americana.'

Hamilton, Andrew, American lawyer: b. Scotland about 1676; d. Philadelphia 4 Aug. 1741. His early career is unknown. He was for a time called Trent, and it is not certain at what period he took the name of Hamilton. About 1697 he appeared in Accomac County, Virginia, where he opened a classical school. In 1716 he went to Philadelphia, the next year became attorney-general of Pennsylvania. From 1721 to 1724 he was in the provincial council, and in 1727 was elected from Bucks County to the provincial assembly, continuing to hold his seat, with a year's exception, until 1739, and in 1729 was speaker. He is best known for his gratuitous defense of John Peter Zenger, a New York printer, who was charged with libel in

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publishing in a newspaper owned by him statements regarding the interference by the governor with the process of the law-courts. Hamilton's defense was based on the truth of the statements in the alleged libel. He was successful, was granted the freedom of New York, and, having thereby secured a freer discussion of public officers, was termed by Morris the "day-star of the Revolution." He became judge of the vice-admiralty court of Pennsylvania in 1737.

Hamilton, Anthony, COUNT, English courtier, and man of letters: b. probably Roscrea, Tipperary, Ireland, 1646; d. St. Germain-en-Laye, France, 6 Aug. 1720. He was descended from a younger branch of the family of the dukes of Hamilton in Scotland. His parents were Catholics and Royalists, and removed to France after the death of Charles I., and young Hamilton became domiciliated there. He, however, made frequent visits to England in the reign of Charles II. His sister was married to Count Grammont (q.v.). On the ruin of the royal cause he accompanied James to France, where he passed the rest of his life. Hamilton is chiefly known as an author by his 'Memoirs of Count Grammont,' a lively and spirited production, exhibiting a free and, in the general outline, a faithful delineation of the voluptuous court of Charles II. It is an admirable chronicle of the frivolous life of the French and English courts of that time. His other works are 'Poems' and 'Fairy Tales,' which, as well as the 'Memoirs,' are in French, and are really masterpieces of grace and sprightliness.

Hamilton, Edward John, American educator: b. Belfast, Ireland, 29 Nov. 1834. He was graduated at Hanover College, Indiana, in 1853, and at Princeton Theological Seminary in 1858; was professor of mental philosophy at Hanover College in 1868-79, and of philosophy at Hamilton College, Clinton, N. Y., in 1883-91. From 1895-1900 he was professor of philosophy in the State University of Washington. He is the author of what is known as 'Perceptionism' (a system of metaphysical philosophy), and has published 'A New Analysis of Fundamental Morals' (1870); 'The Human Mind' (1883); 'The Modalist' (1883); 'The Perceptionalist or Mental Science' (1899).

Hamilton, Frank Hastings, American surgeon: b. Wilmington, Vt., 10 Sept. 1813; d. New York 11 Aug. 1886. He was graduated from the medical department of the University of Pennsylvania in 1833; in 1861 went to the war as surgeon of the 31st New York volunteers, was made brigade surgeon after the battle of Bull Run, and surgeon of Gen. Keyes' corps in 1862. A year later he became medical inspector of the United States army. He was one of the founders of Bellevue Hospital Medical College in 1861, and was professor of surgery there till he resigned in 1875. Dr. Hamilton was associated with Drs. Agnew and Bliss in the care of President Garfield. He wrote on the principles and practice of surgery three works, regarded as standard on the subjects treated: 'Treatise on Fractures and Dislocations' (1860); 'Practical Treatise on Military Surgery' (1861); and 'The Principles and Practice of Surgery' (1872).

Hamilton, Gail. See DODGE, MARY ABIGAIL.

Hamilton, Gavin, Scottish painter: b. Lanark, Scotland, 1730; d. Rome, Italy, 1797. Sent when very young to Rome, he there devoted himself during the remainder of his life to historic painting. One of his greatest works was his 'Homer,' consisting of a series of pictures representing scenes taken from the 'Iliad.' He published in 1773 'Schola Picturæ Italica,' composed of a number of fine engravings by Cunego, making part of the collection of Piranesi; he there traces the different styles from Leonardo da Vinci to the Carraccis; all the drawings were made by Hamilton, and this admirable collection now forms one of the principal treasures in the first libraries in Europe. He spent the latter part of his life in conducting archaeological excavations in various localities near Rome.

Hamilton, Lord George Francis, English politician: b. Brighton 1845. He was a Conservative member of Parliament for Middlesex in 1868-85, for Ealing division in 1885-1902, in 1874-8 was under-secretary of state for India, and in 1878-80 vice-president of council. In 1885-6, and again in 1886-92 he was first lord of the admiralty, and from 1895 until his resignation in 1903 was secretary of state for India. His naval reconstruction plan of 1889 was the most extensive of the kind ever adopted by Great Britain. As secretary for India he displayed great ability in dealing with the numerous difficulties which arose during his administration.

Hamilton, James, American statesman: b. Charleston, S. C., 8 May 1786; d. at sea 15 Nov. 1857. He was educated for the bar, but entered the army and served with credit as a major in the Canadian campaign of 1812. At the end of the war he resumed the practice of law in Charleston. For several successive years Hamilton was chosen mayor, or, as it was then termed, intendant of Charleston. To his vigilance and activity was chiefly due the detection of a formidable conspiracy in 1822 among the negro population, led by Denmark Vesey, a free mulatto from Haiti. In the same year he was elected to the State legislature, and was also chosen a representative in Congress, of which he soon became a prominent and popular member. He became noted for intense and energetic opposition to the protective system and favored direct taxation, regarding all indirect processes for raising revenue as frauds upon the people, and as disparaging to the popular intellect, as well as popular morals. He quitted Congress to become governor of South Carolina in 1830, at a period when the State had resolved upon nullifying the tariff laws of the federal government. On the settlement of this question by Clay's compromise, Hamilton retired from public life for a time. Later he became interested in the cause of Texas, to which he devoted his personal services, and a large portion of his private fortune. In 1841, while Texas was an independent republic, he was her minister to England and France, where he procured the recognition of her independence. On the death of Calhoun in 1852, he was appointed his successor in the United States Senate, but declined the office.

Hamilton, John Church, American biographer and historian, son of Alexander Hamilton (q.v.): b. Philadelphia 1792; d. 1882.

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Besides editing his father's works (1851), he wrote: 'Memoirs and Life of Alexander Hamilton' (1834-40); 'History of the Republic' (4th ed. 1879); 'The Prairie Province' (1876), sketches of travel.

Hamilton, John Taylor, American Moravian clergyman: b. Antigua, W. I., 30 April 1859. He was graduated from the Moravian College, Bethlehem, Pa., in 1875, and from the Moravian Theological Seminary there in 1877. He was pastor of the Second Moravian Church in Philadelphia, 1881-6, and has been a resident professor at the Moravian College and Seminary from the latter date. He has published 'History of the Moravian Church in the United States' (1895); 'History of the Moravian Church during the 18th and 19th Centuries' (1900); 'History of Moravian Missions' (1900).

Hamilton, John William, American Methodist bishop: b. Weston, Va., 18 March 1845. He was graduated from Mount Union College (Ohio) in 1865, and from Boston University in 1871, was ordained an elder of the Methodist Church in 1870. He was subsequently pastor of various congregations, including that of the People's Church, Boston, founded by him. In 1900 he was appointed bishop. He was corresponding secretary of the Freedmen's Aid and Southern Education Society (1892-1900), and has published 'Memorial of James Lee' (1875); 'Lives of the Methodist Bishops' (1883); 'People's Church Pulpit' (1884); and other works.

Hamilton, Kate Waterman, American novelist: b. Schenectady, N. Y., 12 Nov. 1841. Since 1870 she has lived in Bloomington, Ill. She is the author of 'We Three'; 'Vagabond and Victor' (1879); 'Rachel's Share of the Road' (1882); 'Tangles and Corners' (1882); 'The King's Seal' (1887); 'The Parson's Proxy' (1896); 'The Kinkaid Venture' (1900); 'How Donald Kept Faith' (1900); etc.

Hamilton, Patrick, Scottish reformer and martyr: b. probably Glasgow about 1504; d. St. Andrews 29 Feb. 1528. Adopting during a short residence on the Continent, the principles of the Reformation, when he settled at St. Andrews in 1523 he naturally cherished his new convictions, and in 1526 announced them with a decision that attracted the notice of Archbishop Beaton, who proceeded to have him formally summoned, and put on his trial. Hamilton had meanwhile fled to Germany, where an intimacy formed with Luther and Melancthon deepened his convictions, and after an absence of six months he returned to Scotland. He openly preached in the neighborhood of Linlithgow, and Beaton, under pretense of a friendly conference, contrived to allure him to St. Andrews in January, 1528. The early stages of the conference were marked by a conciliatory spirit, but he was led into damaging avowals of opinion, and the result of his trial, on the last day of February, was that he was convicted of divers heresies, and delivered over for punishment to the secular power, by which he was condemned the same day. In the afternoon he was hurried to the stake in front of the gate of St. Salvador's College, his martyrdom, in the 24th year of his age, having done more to extend the principles of the Reformation in Scotland than his life could have done.

Hamilton, Schuyler, American soldier: b. New York 25 July 1822; d. there 18 March 1903. He was a son of J. C. Hamilton (q.v.) and a grandson of Alexander Hamilton (q.v.). He was graduated from West Point in 1841 and served in the Mexican War and in the Civil War also, becoming a major-general of volunteers in 1862. He was subsequently hydrographic engineer to the department of docks. In 1854 he published 'A History of the American Flag' and in 1877 'Our National Flag, the Stars and Stripes, its History in a Century,' delivered as an address before the New York Historical Society in June of that year.

Hamilton, Sir William, Scottish metaphysician; b. Glasgow 8 March 1788; d. Edinburgh 6 May 1856. Having studied with distinction at Glasgow, in 1807 he entered Balliol College, Oxford, where he gained first-class honors, and in 1813 he was admitted to the Scottish bar. His taste lay in a different direction, and while he diligently applied himself to almost every branch of literature, mental philosophy became his favorite study. In 1820 he became a candidate for the chair of moral philosophy in Edinburgh, rendered vacant by the death of Thomas Brown, but was defeated by Professor John Wilson. He was appointed professor of universal history in the University of Edinburgh in 1821, and in 1826 became a contributor to the 'Edinburgh Review,' and enriched it with a series of articles afterward published in collected form, with large additions, as 'Discussions on Philosophy and Literature, Education, and University Reform.' Of these the most celebrated was his 'Critique of Cousin's Cours de Philosophie,' in which was developed that philosopher's doctrine of the unconditioned. Many of these contributions were translated into the leading European languages, and attracted much attention from continental speculators in philosophy. In 1836 he became a candidate for an Edinburgh professorship, and succeeded in gaining the chair—which of all men living he was perhaps the best fitted to adorn—of logic and metaphysics. His zeal and ability in discharging its duties were rewarded by the number of ardent students whom he gathered around him. The fame of the Scottish school of metaphysicians, which had begun to wane, was gradually re-established; and his influence would have been felt to even a higher degree had he not been struck with paralysis in 1844, from which he never recovered so far as to undertake the full duties of his position. His mind, however, retained its vigor, and he endeavored to carry out literary designs he had previously formed. In 1846 he published an annotated edition of the works of Thomas Reid, and in 1854 the commencement of a similar edition of the works of Dugald Stewart. His lectures were published in 1859-61, under the editorship of Mansel and Veitch. His views are chiefly expounded in the 'Discussions' and in the 'Dissertations' appended to his edition of Reid, and are attacked in Mill's 'Examination.' See Veitch, 'Memoir of Hamilton' (1869); 'Hamilton: the Man and his Philosophy' (1883); Seth, 'Scottish Philosophy' (1890).

Hamilton, Sir William Rowan, Irish mathematician: b. Dublin 3 Aug. 1805; d. there 2 Sept. 1865. He knew Greek and Latin when only 6, and before he had completed his 14th

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year had made himself acquainted with 13 languages, among which were Arabic, Persian, Hindustani, Sanskrit, and Syriac. When 10 years old he began the study of mathematics, and at 17 presented a paper to Brinkley, the Irish astronomer-royal, which exhibited such a profound knowledge of mathematics, that the latter declared the author of it to be already the first mathematician of his age. In 1827, the chair of astronomy in Trinity College, as well as the post of astronomer-royal, becoming vacant, Hamilton obtained both appointments, though then only in his 23d year. His life henceforth was exclusively devoted to abstruse studies. He was knighted in 1835; in 1837 was elected president of the Royal Irish Academy, and was an honorary or corresponding member of the principal scientific academies of Europe and America. In 1828 his 'Theory of Systems of Rays' was published. In this his celebrated prediction, on theoretical grounds, of the existence of conical refraction of a ray of light was given to the world. Reasoning on the properties of light, he came to the conclusion that under certain circumstances a ray, instead of being refracted in the ordinary way, should split up into a cone of rays; a phenomenon afterward proved experimentally by Lloyd to take place under proper conditions. In 1834 his 'General Method in Dynamics' was published. In this work and that on 'Systems of Rays' the whole of any dynamical problem is made to depend on a single function and its differential coefficients. Another important treatise of his is 'Algebra looked on as the Science of Pure Time.' He published also 'Memoirs on Discontinuous Functions, or Equations of the Fifth Degree, etc.' But the foundation on which his fame most securely rests is the discovery or invention of the calculus of quaternions, an instrument of extraordinary power in the solution of intricate problems in mathematics and physics. His 'Lectures on Quaternions' appeared in 1853, and in 1866 a posthumous work on the same subject entitled 'Elements of Quaternions.' See Life of Sir William Rowan Hamilton, by Graves (1883-9), with an Addendum (1892).

Hamilton, Bermuda, a seaport town, the capital of the Islands on Great Bermuda, Long, or Hamilton Island. It has a fine landlocked harbor. Founded in 1790.

Hamilton, N. Y., a village of Madison County, 29 miles southwest of Utica, on the New York, O. & W. R.R. It is the seat of Colgate University (q.v.). It is in a good agricultural region, contains a lumber yard and canning factory, and has a stone quarry, from which the stone for the construction of most of the University has been taken. Hamilton was first settled in 1792, was separated from the township of Paris in 1795, and named in honor of Alexander Hamilton; the village was incorporated 12 April 1816; in 1895 a fire destroyed the business portion of the town, in which the village records were lost. Later in the same year, waterworks and an electric lighting plant were established, which are owned and operated by the town. In 1903 a free library was opened by the Library Association, and it is intended to make it a public library supported by the village corporation. Pop. (1910) 1,689.

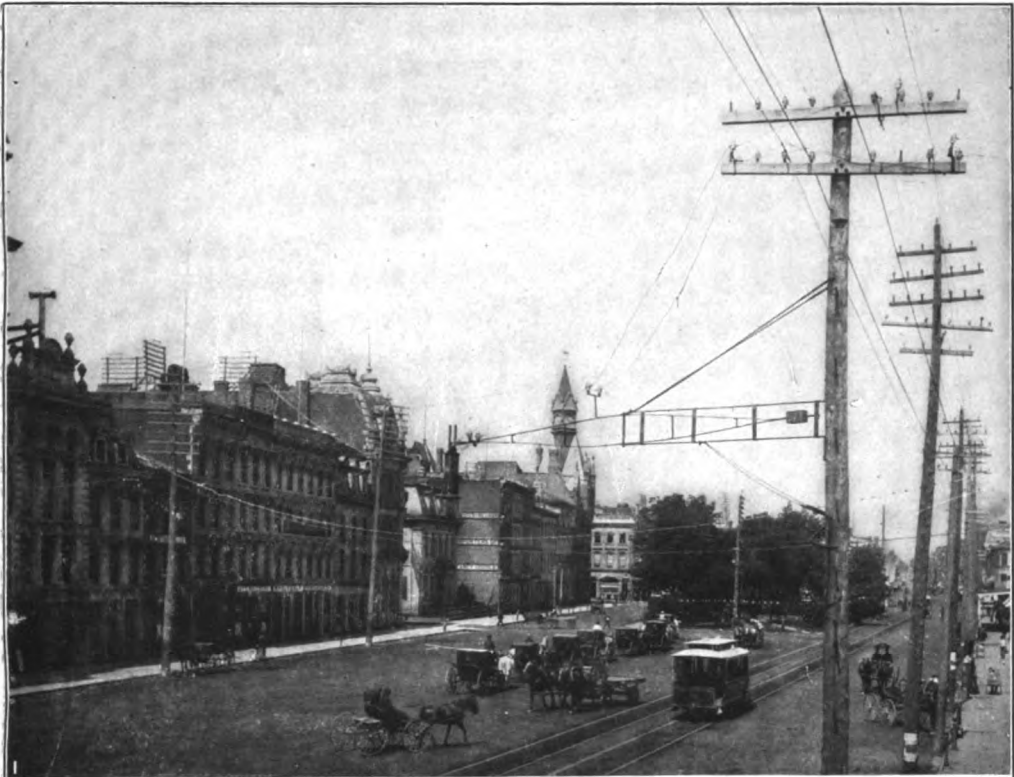
Hamilton, Ohio, city, county-seat of Butler County; on the Great Miami River, the Mi-

ami & Erie Canal, the Pittsburg, C., C. & St. L., and the Cincinnati, H. & D. R.R.'s; about 15 miles north of Cincinnati, and 32 miles southwest of Dayton. Gen. Arthur Saint Clair established here a fort, in 1791, and called it Fort Hamilton, in honor of Alexander Hamilton. It was incorporated as a town in 1810. The excellent water-power has been of great advantage in the development of the city, as manufacturing is its chief industry, although it is located in an agricultural section. The canal has also contributed to the water-power available for manufacturing purposes. Its chief manufactures are paper, flour, beer, woolen goods, agricultural implements, machinery, tools, and iron. The trade is in the manufactured articles and in tobacco, hay, grain, and vegetables. The government is vested in a mayor, who holds office three years, and a board of control composed of five members, each one of whom is the head of a department of the city's government. They are elected for five years. The city owns and operates the electric light plant, the waterworks, and the gas plant. Pop. (1910) 35,279.

Hamilton, Ont., Canada, city and capital of Wentworth County, situated on the shores of Burlington Bay at the western extremity of Lake Ontario, 40 miles from Toronto, 42 miles from Niagara Falls, and 70 miles northwest of Buffalo. It was laid out and settled in 1813 by G. Hamilton, and is built on a plateau of slightly elevated ground extending around the front of a hilly range from Niagara Falls. Hamilton is connected with a large system of Canadian and American Railways,—the Canadian Pacific, Grand Trunk, Toronto, Hamilton & Buffalo, the Michigan Central, the New York Central, and the Lehigh Valley and Wabash Railways. Hamilton's geographical position at the head of Lake Ontario affords the best shipping facilities to the Northwest Provinces and European markets by water, while her railway facilities are not excelled by any city in the Dominion. She has also become a centre of a complete electric railway system. There are 19 miles of street railway, 110 miles of streets, 60 miles of sewers, and 405 street electric lights. Hamilton is the chief manufacturing city in Canada and is in the centre of a fine fruit-growing district. It manufactures very largely, some of the chief industries being agricultural implements, air brakes, and electrical supplies, belting, boots and shoes, carriages, cigars, tobacco, clothing, drugs, elevators, emery wheels, engine packing, fertilizers, files, fireworks, furnaces, gasoline engines, harness, glue, mats, paints, pottery, soaps, spices, silverware, nails, wine, vinegar, mattresses, wringers, washing machines, and musical instruments. It has 2 cathedrals, 62 Protestant churches, 7 Roman Catholic churches, 15 banks, 18 public schools, 7 separate schools, 2 art schools, 2 convents, a public library, 26 charitable institutions, 4 hospitals, 2 incline railways, 4 theatres, a large insane asylum, 7 parks, a wireless telegraph station, 200 groceries, 5 bands, 2 sewage disposal works, 3 reservoirs, capacity (main) 11,000,000 gallons; 50 social and athletic clubs, about 200 national and secret societies, 100 hotels and 3 daily papers. Pop. about 60,000.

J. CASTELL HOPKINS,
Editor 'The Canadian Annual Review of
Public Affairs.'

HAMILTON, CANADA



1. The Gore, King Street

2. View of Hamilton from Mountain

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HAMILTON COLLEGE — HAMLEY

Hamilton College, an institution located at Clinton, Oneida County, N. Y.; founded by Samuel Kirkland, a Congregational missionary, in 1793, as an academy for both white and Indian children. The school was not opened until 1797, although Gen. Frederick William Steuben laid the cornerstone in 1794. Lack of funds prevented the completion sooner, and to the untiring efforts of its founder was due, in a great measure, the success of the undertaking. It was first called Hamilton Oneida Academy, so named in honor of one of its trustees, who was also a benefactor. In 1812 it was chartered by the University of the State of New York as Hamilton College. The school has grown steadily in facilities, keeping well abreast of the times. Two courses are offered: the Latin-Scientific and the Classical. It has fine scientific collections, an astronomical observatory, and well-equipped laboratories. The college has at its disposal 1 fellowship, 55 scholarships, 4 prize scholarships (yielding \$200 each), and a number of valuable prizes. The campus, nearly 100 acres, has many notable improvements, gifts from graduates. In 1906-7 there were connected with the school 20 professors and instructors, and 181 students. The library contained about 47,000 volumes.

OREN ROOT,
Late Registrar.

Hamilton Inlet, Labrador, the estuary of the Hamilton or Grand River. It is 150 miles long and has a maximum width of 30 miles. On its north shore is Rigolet, a Hudson's Bay Company trading-post.

Hamilton, Mount. See LICK OBSERVATORY.

Hamilton Series, a series of rocks, including the Hamilton and Marcellus stages and constituting the Middle Devonian. The name is from the town of Hamilton, 29 miles south of Utica, N. Y., where the series is typically developed. It consists there of shales and sandstones with a few beds of limestones, the most prominent being the topmost member of the series. The Hamilton like the other Devonian formations, was laid down along the Atlantic shores of what was then the American continent and in a great interior sea, sedimentation being heaviest in a northeast gulf of this sea. The sea extended from eastern New York to western Iowa. In the west the series is largely calcareous. The series is about 1,500 feet thick in eastern New York and reaches a maximum of 2,000 to 5,000 in Monroe County, Pa. It rapidly thins westward, and the south end of Lake Huron is only 20 to 50 feet thick. At the falls of the Ohio, above Louisville, the series is represented by 20 feet of hydraulic limestone. The rocks forming the high cliffs along the Delaware River south of Port Jervis, Pa., are of Hamilton Age. Outside of the interior basin rocks of Hamilton Age have been determined in the Gaspe region of Canada, where they reach a thickness of 7,040 feet. In the Eureka district, Nevada, is a great but undetermined thickness of Hamilton limestone, and in the Mackenzie River valley in Northwest Territory is a deposit of fully 500 feet of fossiliferous limestone, partly at least of Hamilton Age. See DEVONIAN PERIOD; DEVONIAN SYSTEM and Equisetæ.

Hamilton Stage, the upper division of the Hamilton series of rocks, consists chiefly of shaly sandstone and fine shales with a few thin

seams of limestone. In Ulster, Albany, and Green counties, N. Y., the thick-bedded shales are known as North River flagstone, and are quarried on the Hudson River near Kingston, Saugerties, and Coxsackie. Some of the thicker layers of these flagstones are known as blue-stone.

Hamites, hām'its (descendants of Ham), the name given to several races in North Africa, who are regarded as of kindred origin and speak allied tongues. They include the ancient Egyptians and their modern descendants, the Copts, the Berbers, Tuaregs, Kabyles, the Gallas, Falashas, Somali, Dankali, etc.

Hamlet, the hero of Shakespeare's most famous tragedy, a personage who appears in history, yet is half mythological, but has been transformed by the genius of the English poet into one of the most dominating figures of literature. It is allowed that Shakespeare's Hamlet was suggested by the Hamleth, or Amleth, of Saxo Grammaticus. The latter's 'History of Denmark' had been published in Paris (1514). François de Belleforest included the tale of Hamlet in his 'Tragic Histories' (1570), an English translation of which appeared in 1608. Shakespeare's drama was written earlier than this last date and must have derived its plot either from de Belleforest's work, or a translation executed before the end of the 16th century, unless the poet, who, we know, was a great reader of histories, took the incident direct from Saxo Grammaticus. According to the Danish historian Hamleth was Prince of Jutland; his father, the King of Jutland, had been murdered by his own brother Fengo, who took the throne and queen of the dead man. Hamleth feigned madness to save his own life. He stabbed one of Fengo's courtiers sent to spy upon him, and had for this purpose concealed himself under a truss of straw. He reproached his mother with her shameful second marriage to such effect that she promised to help him in avenging his father by putting Fengo to death; a promise which she kept.

Hamlet Case, the designation of the first recorded action in 1850 under the Fugitive Slave Law (q.v.) of that year. It is named after Hamlet, a free negro with a family, who was surrendered after a cursory examination, as a fugitive slave of Mary Brown of Baltimore. He had been arrested by a deputy United States marshal in New York, and the whole circumstances of the case so aroused public opinion that Hamlet was finally redeemed.

Hamley, Sir Edward Bruce, English general: b. Bodmin, Cornwall, 27 April 1824; d. London 12 Aug. 1893. Entering the army in 1843, he served through the Crimean war, was professor of military history at Sandhurst 1858-64, and commandant there 1870-77; and division commander in the Egyptian war of 1882. His 'Operations of War' (1866) is a recognized text-book for military examinations. Among his other publications are: 'The Story of the Campaign' (1855), a narrative of the Crimean War; 'Wellington's Career' (1860); 'Voltaire' (1877); 'The War in the Crimea' (1890). He was also the author of a popular novel, 'Lady Lee's Widowhood,' and the admirable sketch entitled 'Shakespeare's Funeral.'

HAMLIN—HAMMER

Ham'lin, Alfred Dwight Foster, American architect: b. Constantinople, Turkey, 5 Sept. 1855. He is a son of Cyrus Hamlin (q.v.). He was graduated from Amherst in 1875, studied architecture in the Massachusetts Institute of Technology in 1876-7 and at the Beaux Arts of Paris in 1878-81, and in 1883 became special assistant in Columbia University. In 1889 he became assistant professor of architecture at Columbia, and in 1891 adjunct professor. His published works include: 'A History of Architecture' (1896); and a 'Handbook of the History of Ornament.'

Hamlin, Augustus Choate, American surgeon: b. Columbia, Maine, 28 Aug. 1820; d. Bangor, Me., 19 Nov. 1905. He was graduated from Bowdoin in 1851, from the Harvard Medical School in 1855, was appointed assistant surgeon to the 2d Maine infantry in 1861, and from 1863 until mustered out in 1865, lieutenant-colonel and medical inspector, United States army. Subsequent to the War he practised in Bangor, of which he was twice mayor, and in 1882-6 was surgeon-general of Maine. Among his works are: 'Martyria' (1866); 'The Tourmaline' (1873); 'Leisure Hours among the Gems' (1884); and treatises on 'Transfusion' (1868); 'Tetanus' (1868); and 'The Transmission of Disease' (1870).

Hamlin, Cyrus, American missionary: b. Waterford, Maine, 5 Jan. 1811; d. 8 Aug. 1900. He was graduated from Bowdoin College, in 1834 and from Bangor Theological Seminary in 1837; and was missionary of the American Board of Missions in Turkey 1837-59. From 1860 to 1876 he was president of Robert College, established after long controversy with the Turkish government. In this position he did much in molding the character of modern Bulgarian leaders, and producing autonomy for Bulgaria. Returning to the United States in 1877 he became a professor in the Theological Seminary in Bangor; and was president of Middlebury College, Vermont, 1880-5. Some of his works are in the Armenian language; those in English include 'Among the Turks' (1877); and 'My Life and Times' (1893).

Hamlin, Hannibal, American statesman: b. Paris Hill, Oxford County, Maine, 27 Aug. 1809; d. Bangor, Maine, 4 July 1891. Though prepared for college, he did not enter, but became the editor of 'The Jeffersonian,' a weekly of Paris, Maine; studied law, was admitted to the bar in 1833, and began practice at Hampden, Maine. He was active in Democratic politics, was elected to the lower branch of the State legislature in 1835, served by re-election until 1840, and was speaker in 1837, 1839, and 1840. Nominated for Congress in 1840, he was defeated by the Whig candidate, but in 1842 was elected, and in 1844 re-elected. Chosen to the Senate in 1848 to fill a vacancy, he was again elected in 1851, but in 1856 resigned his seat to accept the governorship of Maine, to which he had been elected as a Republican. In less than a month, however, he re-entered the Senate for a full term. In 1860 he was elected vice-president on the ticket with Lincoln, and in 1861-5 was president of the Senate. He was thereafter successively collector of the port of Boston (1865-6), United States senator (1869-81), and minister to Spain (1881-3). Hamlin's separation from his party

was due to his strong anti-slavery convictions. During the absence from the House of David Wilmot, he introduced the bill now known as the "Wilmot proviso," and obtained its passage in the House by 115 to 106. As vice-president he was a highly valued counsellor of Lincoln. Consult: C. E. Hamlin, 'Life and Times of Hannibal Hamlin' (1899).

Ham'line, Leonidas Lent, American Methodist bishop: b. Burlington, Conn., 10 May 1797; d. Mount Pleasant, Iowa, 23 March 1865. He was educated for the ministry, but afterward studied law, was admitted to the bar at Lancaster, Ohio, was licensed to preach by the Methodist Church, and was a traveling minister in the Ohio conference. When in 1844 the Methodist Church divided on the slavery question, he was one of the members of the general conference, and drafted the plan for the separation of the northern and southern branches. He was a bishop from 1844 to 1852, when he was retired at his own request. His 'Works' were edited by F. G. Hibbard (1869). Hamline University of Minnesota (q.v.) was named in his honor.

Hamline University, a coeducational institution at Hamline, Minn., between Minneapolis and Saint Paul. The school was established, under the auspices of the Methodist Episcopal Church, at Redwig, Minn., but it was closed in 1869. In 1880 it was reopened at Hamline. In 1910 there were connected with the school 16 professors and instructors in the college of liberal arts and 50 in the medical department. In the preparatory school there were about 125 students, in the college of liberal arts about 300, and in the medical department 161 students. There were 6,500 volumes in the library, and the endowment was \$200,000.

Hammer, a tool for driving nails or wedges and for beating malleable materials. (See Mallet.) There are hand hammers, steam hammers and electric hammers. The ordinary hammer of to-day is essentially an American product. Exactly when the hammer came into use is not told in history, but it is certain that some rude form of the instrument must have been used in the earliest days of handicraft. Of the hammers made in America to-day there is no end. There is the little tack hammer which weighs only a few ounces, and is indispensable in house, store or factory. Then there is the twenty and thirty ton hammer, driven by steam and used for making immense forgings. The numberless effects which are due to its remarkable force of impact have made the hammer a necessity in all trades. Immense manufactories, employing thousands of men, are grinding year in and year out making hammers, while ten times as many wholesale houses are busy putting the product on the market. The industry has advanced to such a stage that many general hardware firms in the United States have thrown out the hammer, leaving it to the houses that deal in tools exclusively.

Hammers are made in a variety of shapes, the most in demand being the claw hammer. This and the shoemaker's hammer have retained their shapes for hundreds of years. One gold beating firm relies on them entirely. The sheets or leaves of gold are hammered to such exceeding thinness that two hundred and fifty thousand are required to make up the thickness of an inch.

HAMMER-HEAD SHARKS—HAMMOND

Another odd product of the hammer factory is the butcher's hammer, used for killing cattle. It is capable when properly wielded of carrying a very heavy blow. Then there are the stone-cutter's hammer, the carpet layer's hammer, the wood carver's mallet and the plumber's odd implement. All of these have a good sale in the markets of the world, because they possess a "something" which users cannot find duplicated in the output of other countries.

Hammer-head Sharks, sharks of the genus *Zygana*, in which the head is produced on either side into a broad lobe, so that the whole has somewhat the appearance of a double-headed hammer; the eyes on the outer ends of the lobes. Five species are known, two of which (*Z. tiburo* and *Z. malleus*) occur in the warm American seas, and the latter reaches a length of 15 feet or more.

Hammer-Purgstall, Joseph, yō'zēf hām'mēr-poorg'stāl, FREIHERR VON, Austrian Orientalist: b. Gratz, Styria, 9 June 1774; d. Vienna 24 Nov. 1856. In 1799 he accompanied as interpreter to Constantinople the internuncio Freiherr von Herbert, who afterward entrusted him with a mission to Egypt, where he collected various antiquities and manuscripts for the Imperial Library. In 1810, on the occasion of the marriage of Napoleon with Maria Louisa of Austria, he accompanied the latter to Paris, where he became intimate with Sylvestre de Sacy and other Orientalists. In 1817 he was appointed imperial councillor at the court of Austria, where he also held the post of interpreter. In 1835 he received the title of Freiherr. Among his numerous literary works may be mentioned: 'Constitution and Administration of the Ottoman Empire' (1815-16); 'Constantinople and the Bosphorus' (1821); 'History of the Ottoman Empire' (1835-6); 'History of the Assassins'; 'History of the Golden Horde in the Kiptshak'; 'History of the Ilkhans'; 'History of Persian Eloquence'; 'History of Turkish Poetry' (1836-8); 'History of Arabic Literature' (1850-7); besides numerous translations from Oriental authors, and contributions to various periodicals.

Hammond, James Henry, American politician: b. Newberry, S. C., 15 Nov. 1807; d. Beach Island, S. C., 13 Nov. 1864. He studied law, was admitted to the bar in 1828, and in 1830 became the editor of a political journal in Columbia, which maintained the doctrine of state rights and advocated nullification in respect to the tariff act of Congress. He entered zealously into the nullification contest which then divided the State, and took an active part in organizing the military force which South Carolina raised in 1833 to resist the Federal government. He was elected to Congress, and took his seat in 1835, but declined a re-election on account of ill health. In 1841 he was elected general of brigade, and in 1842 governor of South Carolina. While governor he published in 1844 a letter to the Free Church of Glasgow on slavery in the United States, and in 1845 two others in reply to an anti-slavery circular issued by Thomas Clarkson, the English abolitionist. These, in connection with other essays on the same subject, were published in 1853, in a volume entitled 'The Pro-Slavery Argument.' In

November 1857 he was elected to the United States Senate, remaining there till 1860.

Hammond, John Hays, American mining engineer: b. San Francisco, 31 March 1855. He was graduated from the Sheffield Scientific School of Yale in 1876, studied at the Royal School of Mines, Freiburg, Saxony, and became an expert on the United States Geological Survey and mineral census, with the duty of examining gold mines in California. In 1882 he was appointed superintendent of silver mines in Sonora, Mexico, but later was again in California as consulting engineer at mines in Grass Valley, and as consulting engineer to the Union Iron Works at San Francisco, and to the Southern and Central Pacific railway companies. In the capacity of consulting engineer he visited many portions of North and South America and Mexico. In 1893 he went to South Africa as consulting engineer to the mining companies operated there by Barnato Bros. of London. He was associated with Cecil Rhodes in the latter's numerous mining interests, and consulting engineer to the Randsfontein Estates Gold Mining Co., the British South African Co. (chartered), and the Consolidated Gold Fields Co. He was one of the four leaders in the reform movement in the Transvaal and for his connection with the well-known Jameson raid, with which, however, he did not sympathize, was sentenced to death by the Boers. This sentence was later commuted to 15 years' imprisonment, and then to the payment of a fine of \$125,000. He resides in New York, with offices there and in London, and is general manager and consulting engineer of the Guggenheim Exploration Co., one of the largest mining companies in the world. His reputation as a mining expert is world wide.

Hammond, Samuel, American soldier: b. Richmond County, Va., 21 Sept. 1757; d. Horse Creek, near Augusta, Ga., 11 Sept. 1842. His impulses led him, while a mere boy, to volunteer in the wars of the Virginia frontier with the Indians, where he is said to have greatly distinguished himself; and to have acquired that skill in stratagem which marked his subsequent military performances. In 1775 he raised a company, and took part in the battle of Longbridge; and in 1779 he was at the battle of Stono Ferry, S. C. After the fall of Charleston he kept the field with a small cavalry force, pursuing the active partisan warfare which alone maintained the revolutionary cause in South Carolina. He subsequently settled in Georgia; in 1802 was elected to Congress from Georgia; in 1805 was appointed by Jefferson to the civil and military command of upper Louisiana; and in 1824 removed to South Carolina, where he became surveyor-general of the State in 1827, and secretary of state in 1831.

Hammond, William Alexander, American surgeon: b. Annapolis, Md., 28 Aug. 1828; d. Washington, D. C., 5 Jan. 1900. He was graduated from the University of the City of New York in 1848; and entering the United States army in 1849 as assistant surgeon, became surgeon-general in April 1862. After the Civil War he practised his profession in New York for some years and in his later life took to writing fiction. Among his publications are included: 'Military Hygiene' (1863); 'Sieep and

HAMMOND—HAMMONTON

Its Nervous Derangements' (1869); 'Diseases of the Nervous System' (1871); 'Neurological Contributions'; etc., and the novels, 'Robert Severne'; 'A Strong-Minded Woman'; 'A Son of Perdition'; 'Doctor Grattan' (1884); 'Mr. Oldmixon'; etc.

Hammond, Ind., was first organized as a town in 1883. In 1884 the government was changed to a city, under the general laws of the State. The city is located in the extreme northwest corner of Indiana, bordering over seven miles upon the Indiana-Illinois state line and two miles on Lake Michigan. It is immediately connected with the city of Chicago, separated only by the imaginary line between the states of Illinois and Indiana, and bounded on the east and northeast with the cities of East Chicago and Whiting, Indiana. These cities are intimately connected with interurban lines, making the three cities practically one.

Industrial growth.—The growth of Hammond has been rapid. The location of the G. H. Hammond Packing Company gave the city its first impetus, and for a number of years it was known as a packing-house town. But that period has entirely passed away and no slaughter houses are now located at Hammond. Instead of the packing industry, numerous other industries of a varied character have come into the city. About 50 different factories are located here. The F. S. Betz Company, manufacturers of surgical instruments and physicians' and dentists' supplies, is the largest of the kind in the world. The W. B. Conkey Printing and Publishing Company is the largest printing and publishing establishment in the United States outside of the Government printing office at Washington. The Standard Steel Car Works turns out 100 steel freight cars per day, besides manufacturing steel passenger cars and wood freight cars, and employs 4,500 men. The Simplex Railway Appliance Company employs 1,500 men. The FitzHugh-Luther Locomotive Works is a large and growing industry. The Hammond Distilling Company is one of the largest distilleries in the United States. It pays annually to the government more than \$5,000,000 in revenue. The Reid-Murdock Company, large wholesale grocers of Chicago, has a plant in Hammond, employing hundreds of people. Besides these large manufacturing concerns, there are in operation in this city some 45 other industries employing from 50 to 500 men each. New factories are being located here continually, and in May, 1912, the Schlessinger Steel Works purchased a tract of 412 acres within the city limits, on which to erect a modern steel plant which will employ 5,000 men.

The Grand Calumet River passes through the city. This stream is navigable and empties into Lake Michigan at South Chicago, Illinois, and being improved by the United States government. Both sides of the river are lined with industries of various kinds. The Indiana Harbor canal connects the river with Lake Michigan, thus affording a harbor on Lake Michigan in Indiana, as well as at the mouth of the river in Illinois. The U. S. Government engineers have recently recommended the building on Lake Michigan at or near Indiana Harbor a large commercial harbor for the interchange of Lake and rail freight, owing to

the unusual facilities afforded for shipping in this locality.

Railroads.—One of the chief distinctions of Hammond is its railroad facilities, having 14 trunk lines and three belt lines. Each of the belt lines connects with every railroad running in and out of Chicago. Seventy-five passenger trains pass each way daily between Hammond and Chicago. The New York Central Lines have their western terminal freight yards in Hammond and make it the distributing and receiving point for all freight east and west, and north and south. There are three interurban lines connecting the city with Chicago, Whiting, East Chicago, Indiana Harbor, Gary and other cities in northern Indiana.

Financial interests.—Hammond is fast becoming a city of large banking and financial interests. Its combined banking institutions represent more than five million dollars in resources; and the city is considered the commercial centre of what is known as the Calumet region.

Superior Court.—The Lake Superior Court is held in Hammond, and in this Hammond is unique, in that while not being a county seat, it has a separate court house for the Superior court, a court consisting of three judges. The court is one of general jurisdiction, and was established by the Indiana legislature to meet the needs of this growing community.

Parks, schools, churches, etc.—Hammond has five beautiful parks, systematically located in different parts of the city, each having beautiful lawns and splendid shade; and the municipal authorities are rapidly developing and improving a system of streets and boulevards connecting each of these parks. The public library is located in Central park. The building is of stone and the library is equipped with the best literary and scientific works. The schools of the city rank well with those of any city of the State. The public schools employ 125 teachers, and in addition to this the Catholic and Lutheran churches maintain four parochial schools, each of which is well attended. The Protestant churches are well represented, the various congregations having large and substantial buildings. St. Joseph's Catholic Church has in course of erection, a building that will, when completed, cost approximately \$100,000. Pop. (1912) 25,000.

VIRGIL S. REITER,

President of the Chamber of Commerce.

Hammondsport, N. Y., town in Steuben County, on the Erie, and the New York, O. & W. R.R.'s; about 55 miles southeast of Rochester and 50 miles southwest of Auburn. The town is in a fertile agricultural section, noted especially for the large number of vineyards. The chief manufactures are wine, fruit-boxes, flour, cigars, barrels, wire hoods, and baskets. Hammondsport has a large trade in wine, and in grapes and other fruits. It contains a high school, and several other good public buildings. Pop. 1,230.

Ham'monton, N. J., town in Atlantic County; on the Philadelphia & R. and the Camden & A. R.R.'s; about 27 miles southeast of Camden and 28 miles northwest of Atlantic City. It is situated in a region noted for its rich farms and abundance of fruit. The chief manufactures

HAMMURABI

are shoes and cigars; but it is the trade centre for the northeastern part of the county, and from Hammonton a large amount of small fruits are shipped to New York and other cities. Pop. (1910) 5,088.

Hammurabi, hām-moo-rā'bē, The Code of, a recently discovered code, instituted by Hammurabi, king of Babylon, about 2200 B.C. The code is a thousand years older than the Mosaic age; older than the laws of either Manu, or Moses. It is engraved on a pillar of black diorite, eight feet high, which was finally unearthed, January 1902, in the acropolis mound at Susa. The obverse of the column is surmounted by a bas-relief which represents the god Bel, the lawgiver, before whom the king stands to receive the law. The inscription which covers this stately monolith is the longest Babylonian record ever discovered. It contained originally about three thousand lines of writing, divided into forty-nine columns; but five columns on the front have been erased by some Elamite king, probably Sutrak Nakhunt, who served the stele of Naram-Sin in a similar manner. The writing is a very beautiful type of the best archaic script, a kind of black-letter cuneiform, long used by kings for royal inscriptions. The code is divided into about 280 clauses, and opens with the words, "Law and justice I established in the land, I made happy the human race in those days."

Character of the Code.—The code shows a most careful and systematic order, beginning with witchcraft, which connects it with a religious code; it passes through all grades of social and domestic life, ending with a scale of official wages for all classes of workmen, even the lowest in the scale. Hammurabi's laws of witchcraft preserve the "ordeal of water."

"If a man has placed an enchantment upon a man, and has not justified himself, he upon whom the enchantment is placed to the Holy River (Euphrates) shall go; into the Holy River he shall plunge. If the Holy River holds (drowns) him he who enchanted him shall take his house. If on the contrary, the man is safe and thus is innocent, the wizard loses his life and his house."

The same ordeal was applied to a wife for unfaithfulness or extravagance, or to a wine-seller who sold drink too cheap.

The three essential features of the code may be clearly defined. First it is based on personal responsibility and the *jus talionis*. Thus: "If any one destroys another's eye, his own eye shall be destroyed. If any one breaks another's bone, his own bone shall be broken. If any one knocks out the tooth of his equal, his own tooth shall be knocked out." Next the belief in the sanctity of the oath before God, as in the Hebrew code, and also the absolute necessity of written evidence in all legal matters, as became a nation of scribes. Judgments in the law courts required a "sealed" document; an agent must take and give receipts for all money or goods entrusted to him; bonded goods required a deposit note. One of the most interesting series of clauses relates to officers or constables employed on active service; the estate of such a person could be entrusted to management, must not be sold or mortgaged, but he must depute a representative, or three years' absence and neglect forfeited his office. Substituted service was not allowed. As might be expected in a land so rich in culti-

vation, the agricultural laws are most explicit. Land must be cultivated, and if neglected the owner had to pay the same as neighboring land. Damage to crop by storm excused the payment of interest on loan. There are very stringent laws as to the tending of the irrigation canals and ditches, and any damage to adjacent land by neglect had to be made good. The commercial laws are extremely important, as showing a highly developed system. Noticeable are the clauses relating to agents or peddlers, commercial travelers of the period.

"If on the road on his business, the enemy have caused him to lose the property he bore, the agent by the name of God shall swear and he shall be quit. If a merchant gives goods to an agent to trade with, the agent shall write down the money, and to the merchant he shall render; the agent a sealed (receipt) for the money he gave to the merchant shall take."

Monetary Transactions.—Money for which no receipt was taken was not to be included in the accounts. In case of dispute all witnesses and documents must be produced. Among the commercial laws are some of much interest at the present time relating to licensed premises. It is curious to note that all wine merchants were females.

"If riotous persons assemble in the house of a wine merchant and those riotous persons she seizes not and drives to the palace that wine merchant shall be put to death."

Curious, too, is the following, which seems to reflect the Hebrew Nazirite law: "No votary or woman residing in the cloister may open a wine shop or enter one for drink on pain of being burned."

In the code's domestic legislation, the most striking feature is the high position and legal protection extended to women. If a man causes a votary or the wife of a man "to have the finger (of scorn) pointed at her and has not justified himself" he is to be branded on the forehead.

To justify herself from scandal a woman could claim the ordeal of plunging in the sacred river. The mere formula of marriage "taking to wife" was not sufficient, for "if a man married a woman and executed not her deeds that woman is no wife." Divorce law is most fully given—a childless woman could be divorced. If divorced without cause the husband must allow alimony and custody of her children, and a portion of the estate equal to a son, and the woman was free to marry. The woman could get a divorce, but must justify her right to do so. Thus we read:

"If the wife of a man who dwells in the house of that man has set her face to go forth, and has acted the fool, and wasted his house, and impoverished his house, they shall call her to account. If the husband shall say, I put her away, he shall put her away. She shall go her way; for her divorce he shall give her nothing."

If the husband insisted, such a wife could be drowned. There is, however, a kindlier tone in the law as to a sick wife. "If a man has married a wife, and sickness has seized her, he may take a second wife, but the sick wife he shall not put away; in the home she shall dwell; as long as she lives he shall sustain her."

Laws of Property.—The laws of property

are most full and based on a most equitable system, one clause relates to the remarriage of a widow with young children, and might be present-day law:

"If a widow whose children are young has set her face to enter into the house of another, without the consent of the judge she shall not enter. When she enters into the house of another, the judge shall inquire regarding the house of her former husband. The house of her former husband to that woman and her future husband he shall entrust and cause them to deposit a deed. They shall keep the house and rear the little ones, but furniture for money they shall not sell. A purchaser that has bought any furniture from the children of the widow shall forfeit his money and return the property to its owner."

Here we have all the essential features of the modern ward in chancery. In the conclusion of this code Hammurabi repeatedly calls himself "King of Righteousness," as did his contemporary Melchisedek of Jerusalem, and enjoins upon all of his successors upon the throne to observe this code and its laws.

Hamon, Jean Louis, zhôn loo-ē ā-môn, French genre artist: b. Plouha, Cotes-du-Nord, France, 8 May 1821; d. St. Raphael, Var, France, 29 May 1874. His work though not strong exhibits grace in drawing and has been popular. His most important work in the United States is 'Among the Flowers,' to be seen in the New York Metropolitan Museum.

Hampden, John, English statesman: b. London 1594; d. Thame, Oxfordshire, 24 June 1643. He was educated at Oxford and possessing an ample estate, led for several years the usual career of country gentlemen. He was cousin-german, by the mother's side, to Oliver Cromwell. He entered Parliament in the beginning of Charles I.'s reign as member for Gram-pound, and continued to sit in the House of Commons three times in succession as member for Wendover, and finally for Bucks. In 1636 his resistance to Charles' demand for ship-money made him the argument of all tongues, especially as it was after the decision of the judges in favor of the king's right to levy ship-money, that Hampden refused to pay it. Being prosecuted in the Court of Exchequer, he himself, aided by counsel, argued the case against the crown lawyers for twelve days before the twelve judges; and although it was decided against him by seven of them to five, the victory, as far as regarded public opinion, was his. From this time he received the title of the "patriot Hampden." In the following year (1637) he was one of those who meditated emigration to America, which they were prevented from carrying out by an order in council detaining them. Henceforward he took a prominent part in the great contest between the crown and the Parliament, and was one of the five members whom the king, in 1642, attempted, in person, to seize in the House of Commons. When civil war broke out Hampden acted with his usual decision, took command of a regiment in the parliamentary army, under the Earl of Essex. Prince Rupert having appeared near Thame, in Oxfordshire, Hampden joined a few cavalry that were rallied in haste, and in the skirmish that followed on Chalgrove Field, received a wound which proved fatal six days

after its infliction. His death was a great subject of rejoicing to the royal party, and of grief to his own. His character and conduct, from first to last, evince his conscientiousness, and he has taken his rank by acclamation on the one side, and tacitly on the other, high in the list of English patriots. Consult: Nugent, 'Memorials of John Hampden' (1831); Forster, 'Life of Hampden' (1837); Gardiner, 'History of the Great Civil War,' Vol. I. (1880).

Hampden, Renn Dickson, English Anglican bishop: b. Barbadoes, W. I., 29 March 1793; d. London, England, 23 April 1868. Although a man of moderate abilities both as philosopher and theologian, it was his fortune to precipitate one of the most notable controversies in the English Church. As Bampton lecturer for 1832 he lectured on 'The Scholastic Philosophy Considered in its Relation to Christian Theology,' which brought upon him the charge of Arianism, and when he became regius professor of divinity at Oxford, in 1836, opposition to the appointment was very bitter and widespread. He was accused of heresy and all the leading men in the Anglican Church took sides in this theological war of words. In 1847 he was nominated by Lord John Russell for the see of Hereford and the strife of ten years previous was renewed in organized fashion, many bishops uniting in remonstrance and the dean of Hereford openly resisting. He was nevertheless consecrated in March 1848, and his episcopate of 20 years was quiet and uneventful, the echoes of the great controversy having ceased long before his death.

Hampden, Maine, town in Penobscot County; on the Penobscot River; about five miles southwest of Bangor. The chief manufactures are flour and lumber. There is an extensive river trade, chiefly in lumber and food products. The town is one of the oldest in the State, but recently it has grown steadily in industries and population. Pop. (1910) 2,380.

Hampden-Sidney College, in Hampden Sidney, a village near Farmville, in Prince Edward County, Va. The school was founded by the Presbyterian Church of Hanover, in 1776, and in 1783 was incorporated by the legislature of Virginia. The land was donated by Peter Johnston, but the acreage has been increased by gifts and purchases, and the college now owns 250 acres. Among the incorporators were Patrick Henry, James Madison, Nathaniel Venable, Paul Carrington, William Cabell, Sr., and many other famous Virginians. Rev. John Blair Smith, the first president of Union College, New York, had previously been president of Hampden-Sidney, also Rev. Archibald Alexander, a founder of Princeton Theological Seminary. It grants the degrees of bachelor of arts, bachelor of science, and bachelor of literature. In 1910 there were in attendance 110 students. The library contained 15,000 volumes.

Hampton, Wade, American general: b. South Carolina 1754; d. Columbia, S. C., 4 Feb. 1835. During the Revolutionary War he served under Sumter and Marion. He was a Democratic representative in Congress from South Carolina 1795-97, and again from 1803 to 1805. In 1809, he was promoted to be brigadier-general, subsequently was stationed in command at New Orleans, was superseded; in 1813 he was raised to the rank of major-general and ap-

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pointed to command the force stationed at Norfolk, whence he was shortly afterward ordered to the northern frontier and placed in command of the army on Lake Champlain, with directions to threaten Montreal. The attack on Montreal, for which 12,000 men had been concentrated near Lake Champlain, was frustrated by Hampton's unwillingness to co-operate with his colleague General Wilkinson, with whom he had been long at enmity. Hampton resigned his commission 6 April 1814, and passed the rest of his life in agricultural pursuits. He was considered the wealthiest planter in the United States, and was reputed to be the owner of 3,000 slaves.

Hampton, Wade, American soldier: b. Columbia, S. C., 28 March 1818; d. there 11 April 1902. He was graduated from the University of South Carolina, studied law but never practised, managed extensive plantations in South Carolina and Mississippi, served in both houses of the State legislature, but, as a Union Democrat, was not popular among South Carolinians. At the beginning of the Civil War, he formed and equipped at his own expense the command of cavalry, infantry, and artillery known as 'Hampton's legion.' With this he won distinction at the first Bull Run and at Seven Pines, where half his troops were killed and himself severely wounded. Having been made brigadier-general of cavalry and assigned to J. E. B. Stuart's command, he took part in Lee's advance northward (1863), was prominent at Gettysburg, and later brilliantly opposed Sheridan's progress in the Shenandoah valley. He attained the rank of lieutenant-general in 1864, and was placed in command of Lee's entire cavalry forces. In 1865 he commanded J. E. Johnston's cavalry, and endeavored to prevent Sherman's northward advance from Savannah. After the war he was an active reconstructionist; in 1876 was nominated as the Democratic candidate for governor, and, after a contest regarding the election with D. H. Chamberlain, the Republican nominee, served until 1878, when he entered the United States Senate. He was in the Senate until 1891, and in 1893-7 was United States commissioner of railroads.

Hampton, Iowa, city, county-seat of Franklin County; on the Chicago G. W., and the Iowa C. R.R.'s; about 29 miles by rail south of Mason City and 60 miles north by west of Marshalltown. It is situated in an agricultural and stock-raising region. The chief industrial establishments are cigar factories and aluminum works; and its principal trade, in addition to the manufactured articles, is in grain, tobacco, live stock, and horses. Pop. (1910) 2,900.

Hampton (formerly HAMPTON COURT-HOUSE), S. C., village, county-seat of Hampton County; on a branch of the Atlantic C. L., and the Hampton & Branchville R.R.'s; about 67 miles southeast of Augusta. The village is in the yellow pine section, but cotton, sweet potatoes, and Indian corn are the staple products of the surrounding farm lands. Its chief manufactured article is lumber. Pop. (1910) 748.

Hampton, Va., town, county-seat of Elizabeth City County; on the north shore of Hampton Roads, on the Chesapeake & O. R.R.; about two and a half miles from Fortress Monroe

and 15 miles north by west from Norfolk. In the last of the 16th and first of the 17th centuries the Indian village Kiquotan occupied the site of the present town of Hampton. John Smith and Lord Delaware mention (1608-10) the peaceful friendly Indians of Kiquotan, the hunters and fishermen; but before 1610 there were whites living along the shore and in this Indian village which retained its Indian name for some time after it became a white settlement. In the first session of the Virginia House of Burgesses or Colonial Legislature (1619), the borough of Hampton was represented. In the war of 1812 the town was attacked by the British and a large part was burned. In 1861 it was again burned by the Confederates. The Church of Saint John, Protestant Episcopal, built 1660, is still in good repair. Hampton contains a National Soldiers' Home, which has 2,000 resident veterans; a National Cemetery which contains 3,323 graves of soldiers, 600 of them of unknown dead. It is the seat of Hampton Normal and Agricultural Institute (q.v.). It has some manufactures; brick, fish-oil, and canned crabs. It has considerable trade in fish, especially oysters, and in fruits and vegetables. It has excellent bathing facilities and is a popular resort. Pop. (1910) 5,505.

Hampton Court, England, a royal palace situated near Hampton, a village of Middlesex, 15 miles southwest of London. The palace is about one mile from the village. The original edifice consisted of five quadrangles, of which two remain; it was built by Cardinal Wolsey in 1525, and presented in 1526 to Henry VIII., by whom it was subsequently enlarged, and who formed around it a royal park or chase, which he enclosed and stocked with deer. A third quadrangle was added by Sir C. Wren for William III., who laid out the gardens and park in Dutch style. Hampton Court contains many valuable pictures by Holbein, Lely, Kneller, West, etc. The gardens comprise about 44 acres, and contain a famous "maze" and "wilderness." Hampton Court was inhabited by successive monarchs and their families until the reign of George II. Suites of apartments in Hampton Court palace are now set apart for persons of rank in reduced circumstances. The state apartments, picture gallery, gardens, and home park are open to the public. In 1886 the palace suffered considerable damage by fire.

Hampton Court Conference, a meeting at Hampton Court (q.v.), on the 14th, 15th, and 16th of January 1604, which was convened on the petition of the Puritan ministers to King James I. for moderation and tolerance on religious questions. By the composition of the conference,—on the episcopal side being the Archbishop of Canterbury, eight bishops, five deans, and two doctors, and on the Puritan side only four representatives,—the king sufficiently indicated his attitude toward the aims of the Puritans, and the proceedings consisted chiefly of adulation of James on the part of the episcopal party, and lecturing of the Puritan members by King James. A few alterations were made in the Prayer Book, and a new version of the Bible was agreed upon, the result being the authorized version of 1611.

Hampton Normal and Agricultural Institute, a school for negroes and Indians,

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opened in 1868, in Hampton, Va., under the auspices of the American Missionary Association. It was chartered by the State in 1870. The school is owned and controlled by a private corporation, administered by 17 trustees. The charter gives the trustees power to choose their own successors, and to hold property without taxation to the amount of \$800,000. In 1875 the General Assembly of Virginia passed an act giving the Institute one third of the agricultural college land-grant of Virginia (see COLLEGES, LAND-GRANT) amounting to 100,000 acres, which was sold for \$95,000 and which pays regular annual interest. The school was first opened in an old barracks (used during the Civil War), with two teachers and 15 pupils. It now owns 188 acres on Hampton River, upon which have been erected dormitories, a library, class-room buildings, a church, gymnasium, saw and planing-mill, shops, hospital, domestic-science school, trade school,—in all numbering 60 buildings. The Institute owns also a stock farm of 600 acres, about five miles from the school. The farm land, and the workshops where trades are taught, furnish occupation for the boys and young men. The girls are instructed and employed in sewing and cooking classes, in all the domestic work of the school, and wherever possible learning trades side by side with the boys. In 1806 the Armstrong and Slater Memorial Trade School was opened. (See NEGRO, EDUCATION OF THE.) In this school is taught the theory and practice of blacksmithing, carpentry, house painting, tailoring, and general repairing. The pupils are taught also, mechanical, civil, electrical, and mining engineering. On the farms they are taught how to care for stock, how to raise different crops, and the theory and practice of farming in general. The students are charged \$10 a month for board, which is largely paid in labor. They are expected to provide their own books and clothing, and for the tuitions, buildings, furniture, and the implements used on the farms and in the shops, the school is dependent on the charity of the country. In 1878, 15 Indians, who had been prisoners of war at Saint Augustine, Fla., and in charge of Capt. R. H. Pratt, were admitted as students. Since then the Indian department has increased steadily, the pupils being chiefly from the Sioux tribe, of whom two thirds make a fair or good record. The young men of the school are organized into six military companies, all forming one battalion. This places the young men under military discipline. The 'Southern Workmen,' a monthly school periodical, is edited, printed, and managed by the pupils with only a general supervision by one of the teachers. The vacation is from June to October for all except the pupils in the industrial departments, which continue work all the year. During the regular long vacation a large number of the colored teachers of the South assemble here for a summer school. For the past ten years the average attendance at these summer schools has been nearly 500. The graduates number about 1,545, more than half of whom are teaching in the colored schools of the South. In 1905-6 the number of pupils in the Hampton Institute was 1,383, about 90 per cent of whom were in the industrial and preparatory departments, the remainder in the college department.

The faculty, instructors and officers numbered 165. The library contains about 18,195 volumes. Many of the graduates are engaged in farming or working at trades; some are teaching. Booker T. Washington (q.v.), of the class of 1875, is the most noted graduate. Hampton's endowments amount to about \$1,100,000. The annual income is about \$170,000, and comes from the Government Indian Funds, the Slater and Peabody Funds, the State land-grant and agricultural funds, and from private donations.

Hampton Roads, Va., a broad deep channel which connects the estuary of the James River with Chesapeake Bay; really a part of the estuary which is at the mouths of the James, Elizabeth, and Nansemond rivers. Some of the good harbors along the shore are Norfolk and Portsmouth on the south; Hampton, on the Hampton Creek, an arm of the Hampton Roads, on the north. At the entrance are Forts Monroe and Wool. On the north side of the entrance is Thimble Shoal light, at lat. $37^{\circ} 42' N.$ and lon. $76^{\circ} 14' 5'' W.$ A large number of railroads have terminals on Hampton Roads, especially at Norfolk. This estuary, or channel, is considered of great military importance. During the Civil War its advantages as a military station were demonstrated. On Hampton Roads occurred the battle of Hampton Roads (q.v.), the first engagement between ironclads.

Hampton Roads, Battle of. Hampton Roads was the rendezvous of several important naval and military expeditions during the war, and the scene of two memorable encounters. On 8 March 1862 the Confederate ram *Merrimac* (or *Virginia*) left her anchorage at Norfolk, 12 miles from Fort Monroe, steamed down Elizabeth River and, with her consorts, five in number, attacked the Union fleet of five vessels in the roads, destroying the Congress and Cumberland, which lost over 250 men, and then retired to the mouth of Elizabeth River. Next morning the *Merrimac* returned to the roads to complete the destruction of the Union fleet, but was met by the *Monitor*, which had arrived the night before from New York, and a novel naval battle ensued, resulting in the return of the *Merrimac* to Norfolk and the saving of the remainder of the Union fleet. See *MONITOR AND MERRIMAC*.

E. A. CARMAN.

Hampton Roads Conference, an informal conference held 3 Feb. 1865, between President Lincoln and Secretary of State Seward, representing the United States government, and Vice-President Alexander H. Stephens, Senator Robert M. T. Hunter, and Assistant Secretary of War John A. Campbell, representing the Confederate States. The meeting took place on board the *River Queen*, near Fort Monroe, and its object was the arrangement of a peace between the North and South. The originator of this conference was Francis P. Blair (q.v.) who thought a combination of North and South against Maximilian in Mexico, in enforcement of the Monroe doctrine, would bring in peace by a diversion. President Lincoln refused to join the conference excepting with a view to the restoration of union, and on the understanding that the Emancipation Proclamation was to

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stand without qualification. He disapproved of a joint action against the French in Mexico. The conference lasted for four hours, but broke up without reaching any definite conclusion.

Hamstring. See ANATOMY; MUSCLES.

Han-yang, hān-yāng'. See HANKOW.

Han'aford, Phebe Ann Coffin, American Universalist minister: b. Nantucket, Mass., 6 May 1829. In 1849 she was married to J. H. Hanaford, a teacher. She was the first woman ordained to the ministry in New England and since her ordination in 1868 has held pastorates in Hingham and Waltham, Mass., New Haven, Conn., and Jersey City. She has been industrious as a writer, among her many published works being 'Life of Abraham Lincoln'; 'Life of George Peabody'; 'Lucretia the Quakeress'; 'Leonette, or Truth Sought and Found'; 'The Best of Books and its History'; 'Frank Nelson, the Runaway Boy'; 'The Soldier's Daughter'; 'Field, Gunboat, and Hospital'; 'Women of the Century'; 'From Shore to Shore, and Other Poems'; etc.

Han'cock, John, American statesman: b. Braintree, Mass., 23 Jan. 1737; d. Quincy, Mass., 8 Oct. 1793. He was graduated at Harvard College in 1754, but shortly after entered the counting house of an uncle, on whose death in 1764 he received a fortune of £80,000. After 1766 he was several times elected to the Massachusetts General Court. It was the seizure of his sloop, the *Liberty*, that occasioned the riot in 1768, when the royal commissioners of customs narrowly escaped with their lives. After the so-called "Boston massacre," in 1770, he was a member of the committee to demand of the royal governor the removal of the troops from the city, and at the funeral of the slain delivered an address which greatly offended the governor, who now endeavored to seize the persons of Hancock and Samuel Adams. Both were members of the Provincial Congress at Concord and later of that at Cambridge, and Hancock was president of each. This arrest is said to have been one of the objects of the expedition to Concord which led to the first battle of the revolution after which Gage offered pardon to all the rebels except these two, "whose offences," he added "are of too flagitious a nature to admit of any other consideration but that of condign punishment." In 1775 Hancock was chosen president of the Continental Congress, and in 1776 signed the Declaration of Independence. He resigned from the presidency in 1777, but was a member of the Congress until 1780, and again in 1785-6. With rank of major-general, he commanded the Massachusetts forces in the Rhode Island expedition, in 1780 was a member of the Massachusetts constitutional convention, and under that constitution was in 1780 chosen first governor. To this office, with an interval of two years (1785-7) he was annually re-elected till his death. Hancock was a man of strong common sense and great decision of character, of polished manners, easy address, affable, liberal, and charitable. His personal vanity, and his jealousy were at times conspicuous, but he was a sincere patriot, and of much ability. John Adams said of him: "He was by no means a contemptible scholar or orator. Compared with Washington, General

Lincoln, or Knox, he was learned." See A. E. Brown, 'John Hancock: his Book' (1898).

Hancock, Winfield Scott, American soldier: b. Montgomery Square, Pa., 14 Feb. 1824; d. Governor's Island, New York harbor, 9 Feb. 1886. He was graduated from the United States military academy in 1844, and after frontier service in the Sixth infantry fought with credit in the Mexican war, was successively regimental adjutant and quartermaster in 1848-55, and briefly assistant adjutant-general to the Department of the West. Appointed assistant-quartermaster with rank of captain in 1855, he was stationed at Fort Myers, Fla., during the Seminole disturbances, and in 1857-8 was in Kansas, whence, after service, in the border troubles, he was ordered successively to Utah and California. In 1859-61 he was chief quartermaster of the southern district of California, with headquarters at Los Angeles. At the beginning of the Civil War, he was commissioned brigadier-general of volunteers, and assigned to the command of a brigade in Smith's division, Fourth corps, Army of the Potomac. He distinguished himself at Williamsburg and during the second day's fight at Antietam (17 Sept. 1862) was placed in command of the 1st division, Second army corps. Promoted major-general, U. S. V. (November 1862), he commanded his division at Fredericksburg in the attack on Marye's Heights, on which occasion he lost 2,013 from a total of 5,006 troops. He largely saved the day at Chancellorsville (2-4 May 1863), and shortly afterward was assigned to the command of the Second corps. In July 1863, he was ordered by Meade to proceed to the field of Gettysburg, take command, and report whether battle should be given at that point. He reported Gettysburg as the suitable place for the ensuing battle, reorganized the Federal lines, on 2 July commanded the left wing, and on the next day the left centre, against which was directed a Confederate charge in the course of which the Second corps lost about 4,000 killed and wounded out of less than 10,000 troops and Hancock was shot from his horse. In 1866 he was appointed major-general, U. S. A., in 1866-8 commanded successively the departments of Missouri, and of Texas and Louisiana, in 1868-9 the military division of the Atlantic, in 1869-72 the department of Dakota. He was again assigned to the division of the Atlantic in 1872. In 1880 he was Democratic candidate for the presidency, but was defeated by Garfield by a vote of 4,454,416 to 4,444,952. He was a brilliant leader, known as "Hancock the Superb,"—"the most conspicuous figure," says Grant, "of all the general officers who did not exercise a separate command." Consult the 'Life' by Walker (1894).

Hancock, Mich., village in Houghton County; on Lake Portage, and on the Duluth, S. S. & A. railroad; opposite Houghton (q.v.). Although the northern part of Michigan and this region had been explored by missionaries in the 17th century, the first permanent settlement was made in Hancock in 1850, and the village was incorporated in 1863. It is situated in a section rich in minerals, the Lake Superior copper belt. The Calumet and the Hecla copper mines are nearby, and the village has foundries, machine-shops, smelters, stamp-mills, lumber and brick yards. A ship-canal to Lake Superior brings a large portion of the lake traffic to and

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from Duluth and Superior through the "short cut," by way of Hancock. It is the seat of a Finnish college. The government is vested in a president, whose term of office is one year, and a village council who are elected by the people. The village owns and operates the waterworks. Pop. (1910) 8,981.

Hancock, N. Y., village in Delaware County; at the junction of the two branches of the Delaware River, on the Erie and the N. Y., O. & W. R.R.'s. Nearby are bluestone quarries, which add to the industrial wealth of the village. Hancock has flour-mills, tanneries, a wood alcohol factory, and large lumber-yards. It is a trade centre for an extensive agricultural region. Pop. (1910) 1,329.

Hancock, Mount, a peak of the Big Game Range, in the southern part of the Yellowstone National Park, on the boundary between the Park and Wyoming. It is on the western border of Two Ocean Plateau, a portion of the continental divide. The Snake River (q.v.) has its rise on the east side of Mount Hancock, flows north by west, then south by west around and almost circling the mountain. Mount Hancock is 10,235 feet in height.

Hand, Edward, American revolutionary soldier: b. Clyduff, King's County, Ireland, 31 Dec. 1744; d. Rockford, Lancaster County, Pa., 3 Sept. 1802. In 1774 he came to America as surgeon's mate in the 18th Royal Irish regiment, but he later resigned and entered medical practice in Pennsylvania. At the outbreak of the Revolutionary War, he became a lieutenant-colonel in Gen. William Thompson's brigade, participated in the siege of Boston, and in 1777 was appointed brigadier-general. In 1778 he succeeded General Stark in the command at Albany, and later took part in General Sullivan's expedition against the Iroquois. He sat in Congress in 1784-5, and signed the Pennsylvania constitution in 1790.

Hand. The human hand is composed of 27 bones, namely eight bones of the carpus or wrist arranged in two rows of four each, the row next the fore-arm containing the scaphoid, the semilunar, the cuneiform, and the pisiform, and that next the metacarpus, the trapezium, the trapezoid, the os magnum, and the unciform. The metacarpus consists of the five bones which form the palm, the first being that of the thumb, the others that of the fingers in succession. Lastly, the fingers proper contain 14 bones called phalanges, of which the thumb has but two, all the other digits having three each. These bones are jointed so as to admit of a variety of movements, the more characteristic being those by which the hand is flexed backward, forward, and sideways, and by which the thumb and fingers are moved in different ways.

The chief muscles which determine these movements are the "flexors," which pass down the fore-arm, are attached by tendons to the phalanges of the fingers, and serve to flex or bend the fingers; and the "extensors" for extending the fingers. There are two muscles which flex all the fingers except the thumb. The thumb has a separate long and short flexor. There is a common extensor for the fingers which passes down the back of the fore-arm and divides at the wrist into four tendons, one for each finger, each being attached to all three

phalanges. The fore-finger and little finger have, in addition, each an extensor of its own, and the thumb has both a short and a long extensor. The tendons of the muscles of the hand are interlaced and bound together by bands and aponeurotic fibres, and from this results a more or less complete unity of action. It is sometimes difficult to make a movement with a single finger without the others taking part in it, as in executing instrumental music, for instance; but practice gives to these movements perfect independence.

Of all the movements of the hand the opposition of the thumb to the other fingers, alone or united, especially characterizes the human hand. This action of the thumb results from its length, from the first metacarpal bone not being placed on the same plane as the other four, as is the case in the monkey, and from the action of a muscle—the long flexor of the thumb—peculiar to the human hand. This muscle completes the action of the other motor of the thumb and permits man to hold a pen, a graver, or a needle; it gives to his hand the dexterity necessary in the execution of the most delicate work. Properly speaking then, the hand, with its highly specialized muscles, belongs to man alone. It cannot be considered, as in the ape, as a normal organ of locomotion. It is essentially the organ of touch and prehension. It molds itself to a body to ascertain its form; it comes to the aid of the eye in completing or rectifying its impressions. The functions of touch devolve principally on its anterior or palmar face, the nervous papillæ abounding specially at the ends of the fingers. A layer of adipose tissue very close in texture protects, without lessening its power or its delicacy, the network of muscles, vessels, and nerves with which this remarkable organ is equipped.

Handball, a popular game of ball, the bare hand only being used. The game is indigenous to Ireland, but has been transplanted to America, where are the most expert players. Two or four men can play, one or two on a side. As far as is known the game of handball came to the United States about 1840, and has since become one of the sports under the regulations of the Amateur Athletic Union. The game consists of scoring the ball against a single back wall, with a lined-out space of 60 feet in front. The ball coming from the wall must fall between these two lines to be in play. The game is simply to strike the ball on the rebound with the hand.

Handel, George Frederick, (properly **GEORG FRIEDRICH HAENDL**), English composer: b. Halle, Saxony, 23 Feb. 1685; d. London 20 April 1759. His father, intending him for the law, discouraged the strong passion which he evinced early in life for the science of music. But although forbidden the use of musical instruments, the young musician contrived to hide a small clavichord in a garret, where he amused himself during great part of the night after the rest of the family had retired, and made such progress that, when at seven he accompanied his father to the court of Saxe-Weissenfels, he played on the church organ with such power and effect that the duke, who accidentally witnessed his performance, used his influence successfully with his father to permit him to follow his inclination. He was accordingly placed under

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Zachau, organist of the cathedral, and was soon so far advanced in the practical part of the science as to officiate occasionally as deputy to his instructor. At 14 (1698) he went to Berlin, where at that time the opera under the direction of Buononcini and Attilio was in a very flourishing condition. Attilio became his teacher and friend. In 1703 he went to Hamburg, and procured an engagement in the orchestra at the opera there. On 30 Dec. 1704, he brought out his first opera, 'Almira,' in the February following succeeded by his 'Nero,' and subsequently by 'Florindo' and 'Daphne.' He then went to Italy, where he composed the operas 'Rodrigo' and 'Agrippina,' and the first form of the serenade 'Acis and Galatea.' On his return to Germany in 1710 he entered the service of the Elector of Hanover, afterward George I. of England, as chapel-master; but having received invitations to visit London, he set out for England, where he arrived in the latter end of 1710. On the occasion of his first visit to England he composed the opera 'Rinaldo.' He soon returned to Hanover, but at the end of two years again received permission to visit England. At the time of his arrival in London the negotiations for the Peace of Utrecht were just about to be concluded, and Handel was invited by Queen Anne to compose a 'Te Deum' and 'Jubilate' in celebration of the peace. But this act was so distasteful to the Elector of Hanover that Handel did not venture to return, but remained in England on an income of £200 a year allowed him by the queen. He was, in consequence, on the accession of his royal patron to the throne of Great Britain in 1714, in much disgrace, till Baron Kielmannseck restored him to favor. From 1715-18, Handel resided with the Earl of Burlington, and then quitted that nobleman for the service of the Duke of Chandos, who entertained him as chapelmaster to the splendid choir established at his seat at Cannons. For the service of this magnificent chapel Handel produced those anthems and organ fugues which alone would have been sufficient to immortalize him. When the Royal Academy of Music was instituted by some of the leading noblemen of England, Handel, whose fame had now reached its height, was placed at its head; and this, for a short period, may be considered as the most splendid era of music in England. The warmth of his own temper, however, excited by the arrogance and caprice of some of his principal Italian singers, caused many violent quarrels; and public opinion becoming enlisted in favor of his opponents, and especially of his rival, the musician Buononcini, his popularity waned somewhat and the Academy was dissolved (1728). Handel then started a new operatic company. But a rival company to his was afterward started, and the result was that much money was lost by both. The operas which he had composed up to this date (1735), from the institution of the Academy of Music, were 'Radamisto'; 'Ottone'; 'Giulio Cesare'; 'Floridante'; 'Flavio'; 'Tamerlano'; 'Rodelindo'; 'Alessandro'; 'Scipione'; 'Ricardo I.'; 'Tolomeo'; 'Siroe'; 'Lotario'; 'Parthenope'; 'Porro'; 'Orlando'; 'Sosarme'; 'Ariadne'; 'Ezio'; 'Ariodante'; and 'Alcina.' Among other works should be mentioned his first English oratorio, 'Esther,' and his delightful pastoral 'Acis and Galatea.' In 1736 his famous

setting of Dryden's ode, 'Alexander's Feast,' was performed with brilliant success. His last opera was performed in 1741. Handel had by this time begun to devote himself chiefly to music of a serious nature, especially the oratorio. The approval which his first works of this kind 'Esther,' 'Deborah' (1723), 'Athalia' (1733); had met with encouraged him to new efforts; and he produced in succession 'Saul,' 'Israel in Egypt,' and 'The Messiah.' The last-mentioned, his chief work, was brought out at Dublin in 1742. This sublime composition had been composed the previous year, in the incredibly short period of twenty-three days. When Handel returned to London his oratorios were received at Covent Garden Theatre with the greatest approbation by overflowing audiences — 'The Messiah' in particular increased yearly in reputation. Before it was given, however, a new oratorio, 'Samson,' was produced (1743), and there next followed 'Joseph and his Brethren' (1744), 'Belshazzar' (1745), 'Judas Macabæus' (1747), 'Joshua' (1748), 'Solomon' (1749), and 'Jephthah' (1752). Some time before his death he was afflicted by nearly total blindness; but he continued not only to perform in public but even to compose. His own air, however, 'Total Eclipse,' from the oratorio of 'Samson,' is said always to have affected and agitated him extremely after the loss of his sight.

Handel's habits of life were regular; his appetites were coarse, his person large and ungainly, his manners rough, and his temper even violent; but his heart was humane, and his disposition liberal. His musical powers can hardly be estimated too highly. In boldness and strength of style, and in the combination of vigor, spirit, and invention in his instrumental compositions he has never been surpassed. His choruses have a grandeur and sublimity which have never been equaled. Yet a singular fact in regard to him as a musician is that in some of his works he shows himself as an unscrupulous plagiarist — a fact of which various explanations and palliations have been attempted. He was buried in Westminster Abbey, where a monument by Roubillac was erected to his memory. See 'Lives by Chrysander' (1858-67); and Rockstro (1883); Whittingham, 'Life and Works of Handel' (1882); the articles in the 'Dictionary of National Biography' and Grove's 'Dictionary of Music.'

Han'dicap, Brooklyn. See HORSE-RACING.

Handicapping, a term used in racing: The allowance of time, distance, or weight made to the inferior competitors in a race with the object of bringing all as nearly as possible to an equality; the extra weight imposed on a superior horse in order to reduce his chance of winning to an equality with that of an inferior animal. The handicap is framed in accordance with the known previous performances of the competitors, and in horse-racing also with regard to the sex and age of the animals engaged. The principle is the same in other contests, as in billiards a superior player is handicapped by having to allow his inferior competitor a start of a certain number of points.

Handies (hăn'diz) Peak, in the southeastern part of Colorado, in the San Juan Range; about 12 miles northeast of Silverton. Rich

deposits of silver ore are found in all the mountains of this vicinity; the range is known as the 'Silver San Juan.' The altitude of Handies Peak is about 14,000 feet.

Handwriting, Expert Analysis of. A mental image may be made either consciously and with attention to every detail, or with varying degrees of consciousness amounting in some cases to almost complete automatism, but it must in any case be largely influenced by the machine which produces it. No matter what care may be employed to make two objects alike, a sufficiently minute inspection will always discern differences between them. It is from this fact we are able to distinguish a particular tone of a bell, a particular face, etc. All things, and notably those which owe their existence to organic life, are resultants of very complex forces acting simultaneously or in sequence, and in comparing similar resultants it is ever found that quantitative or qualitative differences of the constituent forces employed in fashioning them have occasioned differences in the objects themselves. These differences may be indiscernible to the casual view, but will never fail to reveal themselves to an examination sufficiently searching.

The factors employed in making marks may be roughly divided into: A, the model in the mind which it is the intention to reproduce; and B, the mechanism by which the act is to be accomplished. Under the latter head there is to consider not only the permanent structure of the individual, which necessarily limits his performance, but also the manner of employing this structure, which becomes a habit, and the fluctuations, due to disease, drugs, variations of mood, increasing age, etc., in the motor impulses controlling it.

The basis of any sound judgment on the authorship of designs such as pictures or handwriting, depends upon the recognition of sorts of differences; which it is essential to distinguish from each other. In general, designs by different authors differ in kind, while those of the same author differ in degree. The methods for distinguishing these two sorts of differences will be more particularly treated hereafter.

The general subject of the study of those characteristics which distinguish each handwriting from every other has been called *Grammapheny*; the study of methods for detecting frauds relating to handwriting either in imitating, altering, or suppressing a record, is called *Plassopheny*; and the general study of the records of human thought including their forms, their purport, and the tools and materials by means of which they are produced is called *Bibliotics*.

Ever since the more or less permanent records of human thought have had a value they have been the objects of falsification. It is not known to how great an extent this may have been practised in the hieroglyphic and ideographic carvings on stone, but doubtless interpolations were frequent in recording the deeds of their kings, and the sculptors imitated each other's style with a view of bettering their own; or each other's peculiarities to convey false impressions as to the narrator.

But with the introduction of writing in pigments on parchment and papyrus the greater facility with which alterations and erasures could

be made immediately attracted the attention of the unscrupulous. According to historians the Greeks, Romans, Egyptians, Assyrians, and others practised garbling and forgery by erasing, resurfacing, and bleaching manuscripts to change their purport, or give false impressions of their age and authorship. These depredations, then as now, were chiefly made upon manuscripts of persons absent or, more commonly, deceased; whole compositions which they never saw being ascribed to them. As an example may be cited the interpolation in the text of Josephus with which Eusebius has been charged. A host of epistles, papal decrees, productions of the Fathers, and dogmatical treatises were in early times altered, erased in part, and falsified from the original text, sometimes by learned and reverend scholars for the greater glory of the Church, and sometimes by obscure copyists from ignorance, or trifling incentives. Erasmus declared he knew of but a single important old manuscript which was not tainted by this kind of fraud. The methods of effacing the writing of a parchment multiplied in proportion to the increase of manuscripts and the cost of parchment. The practice of using such effaced parchments for other writings was common in the time of Cicero, as a letter from him to Trebatius testifies. Such writings were called palimpsests; and the custom of producing them gave dangerous experience to perpetrators of fraud in the art of effacing written characters by mechanical and chemical means. Plutarch speaks of this practice as one well known. As the price of parchment rose it began to be the habit in the early libraries to efface the letters from parchments "of little value" in order to replace them by more valuable compositions. Dangerous as was such a rule at any time it became fatal to learning when the choice was in the hands of those who were inflamed against their adversaries in controversy, and against all "pagans," in which class almost all the great authors of our classics were included, and willing to sacrifice the choicest thoughts of the Greeks and Romans in favor of the fanatical dissertations of those they were pleased to call the "faithful."

When the Caliph Omar put an end to the manufacture and sale of papyrus he caused a wholesale destruction of the writings in the libraries throughout the world. Many scholars believe that the world thus lost great stores of classical literature, the exact magnitude of which can never be ascertained or even estimated. (Consult Gustave Itasse, 'Le Faux devant l'histoire,' etc., from which much of the preceding is taken.) According to Adolphe Bertillon ('Revue Scien.' 25; 4 Ser. Vol. VIII. 18 Dec. 1897) the first recorded student of bibliotics was François Demelle in 1609, and the first writer on the subject one Raveneau (1656). In his treatise the latter deplores the lack of science of his colleagues, which however did not prevent their landing him in jail for forgery.

The methods employed in judging the authorship of handwriting by these and almost all later writers on the subject are the same as those relied upon by connoisseurs of painting. They deal exclusively with the pictorial and apparent peculiarities, and the undefined effect these produce upon the mind. The most daring of these methods is the so-called

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"Graphology," described in a pamphlet of the Abbé Michon in 1880, which has many conscientious supporters and partial government recognition in Germany and France. This curious study has for its object the revelation of the character and peculiarities of a writer by his handwriting. It would lead to too long a digression should the various claims of the advocates of graphology be reviewed. It must suffice here to say that some of these not content with finding in the manuscript of an unknown writer personal peculiarities which he already possesses, have imagined they could detect the lurking tendencies to virtuous or vicious deeds such as self-sacrifice, kleptomania, murder, etc., which he has never developed. These are deduced from the pen habits which they think they detect in the writing: such as deliberation, precipitancy, economy of paper, or of effect, etc., etc. M. Bertillon thinks "To the public no proof is so decisive as that of personal identification of individuality, yet how many mistakes are made?" He believes with the exception of the advance in photography the art of handwriting judgment is just where Ravenau left it in the reign of Louis XIV. He forgets the aid he himself has rendered to the art of differentiating and identifying handwriting by the application of his anthropometrical measures for the identification of criminals. The former art without such methods is in precisely the state in which Bertillon found the latter before his demonstration that exact measurements of different parts of the body and the relation to each other of the results of such measurements entirely removed the chance of error in identification, whereas there have been many instances of mistaken identity, or denial of identity by a wife or other near relative of the person in question; The history of this minute branch of research resembles that of other and larger branches. Subjective impressions such as those supplied by the feelings, indicating supposed relative amounts or intensities of emotions or sensibility, which were the only guides to the pioneers of inductive research, gave way to exact methods by employment of instruments of precision recording facts in intelligible units, in estimating, for example, degrees of acidity, pitch of sounds, height of temperatures, intensity of lights. One after the other the old subjects of research were furnished with these unequivocal means of recording phenomena, and all the new subjects were required to find such means or forfeit recognition. Thus through mathematics astronomy, already in the van of exact sciences, was enabled to make enormous enlargements of our view of the universe in the last two centuries, and even those objects of research which seemed to defy such treatment were provided with mathematical methods. Psychology became a science admitting experimentation of which the results can be expressed in units, and chemistry is becoming as loyal a subject of that science of relation—mathematics—as its sisters, physics and mechanics.

The purpose of the investigation of a handwriting will determine the kind of examination that is made. If the object be to ascertain whether a particular signature has been legitimately placed as an authentication of a writing, it is necessary to scrutinize the paper on which it is written for evi-

dence of scratching, erasing, or other tampering; the ink for peculiarities of constitution which may be inconsistent with its use at that time and in that place. The question of superposition of lines may show that the writing it validates was made after the signature. In numerous criminal trials each of these and of many other unmentioned demonstrable facts have at once stamped documents as fraudulent and obviated the necessity of the more particular study of the character of the writing. (Thus a water-mark in a paper on which was written a statement bearing date 1868 represented the German Eagle which was not adopted till after 1870, and this of course showed the whole instrument to be a fraud. A similar conclusion is forced in the case of traced characters purporting to have been written before Hofmann's discovery of the aniline colors yet demonstrably produced by aniline ink.) The value of a signature as authenticating a contract is forfeited if it is clear that parts of the body of the document were written after the signature was written. These and other problems in the domain of plassopheny are too numerous to treat in this place and attention will be directed exclusively to the grounds for deciding two specimens of writing to be by the same or by different hands.

The first and most obvious method is to compare their respective features; large or fine writing; perfect or imperfect shaping of the letters; slant or angle of the stems and tails of letters with the line of writing; peculiarities (of which there are always a number) in the forms of individual letters or in the manner of connecting or grouping them; alterations in pressure producing shading in certain directions, and many other similar details. These peculiarities are pictorial. In all genuine writing they arise from the limitations of the writer, first in forming a mental picture of what he wants to produce, and secondly in producing it. Any one of these peculiarities can be easily imitated by another, and indeed all the visible details together can be drawn or traced by a skilful artist, yet in the latter case not without revealing to one using a magnifying glass that the lines have been slowly and carefully drawn and not dashed off with ease. Even if words are photographed or traced from an original and afterward inked, an ordinary magnifying glass will show a difference in the pen marks from the current facility of the original writer. The careful study of such details constituted the entire basis of judgment of the expert till within recent years, and usually they will suffice; for though the forger should know all the minute peculiarities which are disclosed to the patient study of a handwriting, yet he could not reproduce many of them without betraying in the result a painstaking, labored use of the pen which would excite suspicion. Where the same word or signature occurs twice or more in a document the forger must avoid exact repetition of all the minutiae and at the same time not make such deviations as are inconsistent with the habits of the writer. The most important of these habits for purposes of identification are not pictorial nor immediately apparent to the eye.

Proportions.—Among the most important kinds of characteristics which insensibly influence the judgment in forming a conclusion as to identity of authorship of two specimens of

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handwriting are the proportions between certain parts of a letter, or word, or group of these, which often occur together. Especially is this the case with a signature, which is written so frequently that the act becomes almost automatic and therefore one in which the peculiarities due to the hand and arm making it, and to the brain furnishing the pattern, are most prominent because without the interference of voluntary effort. The result in fact resembles type-writing where the defects in the levers and type-faces of a type-writing machine can be detected; but with this difference that in handwriting they are still recognizable even when from lack of space or other causes the signature is written smaller or larger than usual. In such cases there is found a greater conformity to the established relations of parts of the signature than any foreign hand could make without a pantograph or other artificial aid. These proportions of parts may be detected either individually by carefully noted measurements, or by composite photographs of genuine signatures. Each method has some advantages over the other. In employing composite photography one attains to an ideal signature, because all the possible characteristics of relation in every signature have been introduced, but on the other hand by this means only a form has been evolved—a graphic average—which must then be made the standard for comparison.

Isaac Taylor
George M. Hawley
Enos W. Garrett

FIG. 1.—Composites of genuine signatures.

Isaac Taylor
George M. Hawley
Enos W. Garrett

FIG. 2.—Forgeries of the above signatures.

In the case of the method by actual measurements although only a small fraction of the total number of relations is noted, yet these are in numerical form and can be averaged and the results compared directly.

The principle on which the method by investigation of proportions of parts rests is that the spaces between various distinctive points of a signature bear numerical relations to each other, and to the heights of certain letters, which are constant within comparatively narrow limits whether the signature be written small or large.

The following illustration (Fig. 3) represents a small part of a letter written with pen and ink

and photographed at an enlargement of 30 diameters:

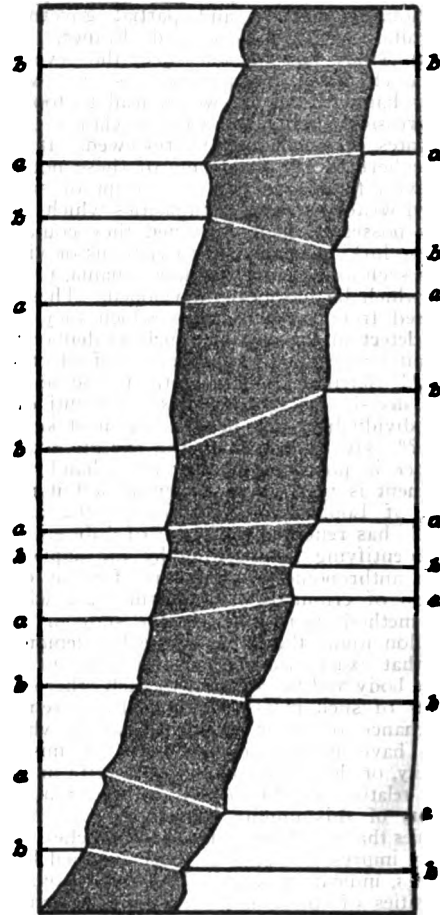


FIG. 3.—The points *a* show the widest and *b* the narrowest parts of the ink lines. It is to be noted that the maxima and minima of the two margins are not always opposite to each other, but show a tendency to oscillate about a horizontal line so that the *a*'s and *b*'s of one margin will be observed alternately above and below such line in following the ink mark downward, while those of the other margin will be found in opposite phase. This is made clearer by the white lines uniting the *a*'s and *b*'s of the opposite margins. This can be accounted for by the simultaneous operation of lateral and vertical movements which are not coincident in period.

Tremograms.—Another valuable individuality in writings executed by means of pen and ink are the irregularities observed in the margins of the lines when examined under a sufficiently high power of the microscope (about 120 diameters). How far this examination will enable one to identify an individual is not yet known, but it has been established that there are characters in the general disposition, number, arrangement, and position of these serrations, which remain comparatively constant in the writings of the same individual with different pens, ink, and paper, and under different mental and physical conditions, and which therefore cannot have other source than peculiar motions imparted to the writing instrument and writing fluid by the writer.

Inks.—Tables for the determination of the characters of inks by qualitative chemical tests have been published by Robertson, Hofmann and others.

To the same end special devices have been made to solve questions relating to the composition of inks without affecting the document or writing fluid: Doremus by means of the spectroscope, Frazer through absorption of light admitted to and

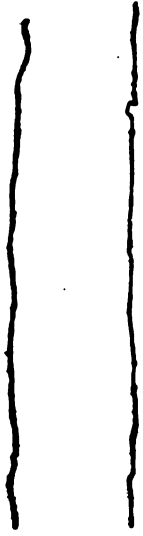


FIG. 4.—A tracing by camera lucida of the margins of an ink line drawn by a pen fixed to a ruling machine. It is enlarged 60 diameters. There is an absence of the irregularities always found in the margins of ink lines made by the human hand.

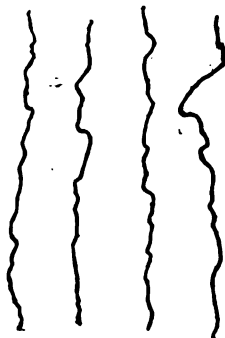


FIG. 5.—Camera lucida tracings of the margins of two ink lines by the same hand made at an interval of fifty-two days. The similarity of character of the serrations in both is noticeable.

reflected by the ink through colored prisms. Sharples has shown that an otherwise invisible record may be made visible through shorter or longer exposure to the sensitive plate of the photographic camera, etc.

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PERSIFOR FRAZER,

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Handy Andy, a novel by Samuel Lover, published in 1842. It is a broadly humorous tale of life among the Irish gentry and peas-

antry in the first half of the 19th century, by an accomplished author who not only could illustrate his own narrative, but could write songs for it and furnish music for them as well.

Han'ford, Cal., city and county-seat of Kings County; on the Southern Pac. and Santa Fe R.R.'s, about 30 miles southeast of Fresno, and 250 miles south of San Francisco. It was first settled in 1871 and was made a city in 1891. Its chief industries are agriculture, fruits, raisins, and livestock. It has also flour and planing mills, milk condensing factory, butter and cheese factories, etc., and is a distributing centre for food products and clothing sent to mining sections in the vicinity. The city government is by a Board of Trustees, the board choosing its own chairman. The city has six banks, and a Carnegie Library. Pop. (1910) 4,829.

FRED A. DODGE,

Editor The Hartford Sentinel.

Hanfstängl, Franz, fränts hānf'stengl, German lithographer: b. Rain, Germany, 1804; d. 1877. He studied art at the Munich Academy, and in 1826 went to Dresden where he began his series of lithographic copies of pictures in the Dresden Gallery, which he completed in 1852. During the latter part of his life he devoted himself to photography and kindred processes.

Hang-Chow, hāng'chow, China, the capital of the province of Che-kiang, on a plain at the southern terminus of the Imperial Canal, and within two miles of the head of the estuary of the Tsien-tang River, about 40 or 50 miles from its mouth, nearly 100 miles southwest of Shanghai. It is a strongly fortified city of oblong form, surrounded with high well-built walls about eight miles in circuit, enclosing many large vacant spaces. The streets are well paved and clean, and there are numerous triumphal arches, monuments to great men, and gorgeous Buddhist temples. The stores and warehouses are noted for their size and the quantity and quality of the goods displayed. More than 100,000 persons are employed in silk manufactures, and among other industries are the weaving of cotton, manufacture of tapestries, carving in ivory, the making of lacquered ware, fans and screens, etc. The houses generally are one story high. A large portion of the inhabitants reside in the suburbs, and in boats on the waters around them. The governor-general of Che-kiang and Fe-kien resides in this city, and also the governor of the province. With their courts and troops, in addition to the great trade passing through, and its activity as a centre of literary and ecclesiastical life, Hang-Chow is one of the most important and richest cities in China. The river, opposite the city, is about four miles broad at high-water, and is crowded with vessels of all descriptions, being the channel by which vast quantities of merchandise are received from and exported to the southern provinces. The extensive Lake of Si-hou, "West Lake," close by the city, is celebrated for its natural and artificial beauties. Chapu, the seaport of Hang-Chow, is 20 miles down the river. Hang-Chow is the celebrated "Kinsai" of Marco Polo—the capital, in his time, of Southern China. It was captured by the Taiping rebels in 1861, and deserted by all its rich or respect-

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able inhabitants. A disciplined force of Chinese, under the command of French officers, united with the Imperialist troops, recaptured the city on 31 March 1864. By the Treaty of Shimonoseki (1895) it was opened to foreign trade, and a district platted for a foreign settlement. Pop. estimated at 700,000.

Hanging, a form of capital punishment inflicted under the common law; also a mode of death sometimes lawlessly visited upon a person, or occurring from accident, or by suicide. In cases of hanging, death seldom results from pure asphyxia, but is usually in some degree owing to apoplexy and injury to the spinal cord. In attempted suicide, bleeding from the jugular vein and artificial respiration may be tried for resuscitation. In difficulty of inducing artificial respiration, laryngotomy and tracheotomy should be performed, and the lungs inflated through the opening in the neck. In judicial hanging, the noose ought to be so adjusted as to produce immediate dislocation of the spinal column, death in that case being instantaneous. In New York State electrocution as capital punishment is substituted for death by hanging, and it has to some extent been tried in other States. (See **ELECTRICITY, CAUSE OF DEATH BY.**) In several American States infliction of the death penalty is forbidden by law. Hanging, drawing, and quartering were once the punishment of treason in England. See **CAPITAL PUNISHMENT.**

Hanging Rock, Battle of, fought 6 Aug. 1780. It occurred on Hanging Rock Creek, S. C., between Col. Sumter's Americans, some 800 in number, and about as many Loyalists commanded by Maj. Carden. After driving back the Loyalists, the Americans, becoming disorganized while plundering the enemy's camp, were in turn put to flight. The American loss is unknown; that of the Loyalists, in killed, wounded, and missing, is recorded as 269. Consult Lossing, 'Field-Book of the American Revolution.'

Hankow, hân-kow' ('Mouth of the Han'), China, a town and river-port in the province of Hu-peh, at the junction of the Han with the Yang-tse-kiang, 688 miles above the mouth of the Yang-tse, which is navigable for large vessels up to the town. On the opposite bank of the Han is Hanyang, on the other side of the Yang-tse is Wuchang, the three together forming one immense city. In addition there is a large floating population, the Han being densely crowded with junks for about half a mile above its mouth. In 1857 the city was almost totally destroyed by the Taipings. The port was opened to foreign trade by the Treaty of Tientsin, ratified in 1860; and soon became the chief emporium for the tea trade of the central provinces. A concession of about 90 acres of land apart from Chinese jurisdiction is laid out like an English town. The residents of the British concession are formed into a municipality, with a council empowered to levy taxes. There are also German, French, and Russian settlements. The foreign trade of this port is one of the most important in China. The imports are brought almost exclusively from Chinese ports (about one half from Shanghai), and consist partly of foreign produce, such as cottons, woollens, and opium; partly of native produce, such as tea, silk, cotton, etc. Pop. about 850,000.

Han'na, Marcus Alonzo, American politician: b. New Lisbon, O., 24 Sept. 1837; d. 15 Feb. 1904. In 1852 his family moved to Cleveland, where he was educated in the public schools and he also took a year's course of study in Western Reserve University. He left college to enter the grocery trade with his father, and later had entire control of the business. In 1867 he became a partner with his father-in-law in the firm of Rhodes & Co., engaged in handling coal and iron; he soon mastered the details of the business, greatly extended the work of his firm, and was the first to build steel steamships for the lake trade. In 1877 he became the controlling partner of the firm, the name of which was changed to M. A. Hanna & Co., and acquired large interests in lake navigation. He also was for a time manager of a theatre, and president of the Union National Bank of Cleveland, and of the Cleveland City Railway Co. In 1880 he organized a business men's political club, and from that time was active in politics. In 1884 he was sent as a delegate to the Republican National Convention, and in the next convention (1888) was John Sherman's political manager. He first gained a national reputation, when he obtained the nomination of McKinley for President at the Convention of 1896, and as chairman of the Republican national committee, conducted the Presidential campaign, which resulted in a large plurality for McKinley. In this campaign he adopted the methods which had made him successful in business, studying the situation and its needs, and carefully attending to details. In 1897 he was appointed United States Senator to succeed Sherman, who resigned before the completion of his term of six years. In 1898 he was elected to a full term, and in 1904 re-elected, but died before taking his seat. In 1900 he again conducted the Presidential campaign. As a large employer of labor, Senator Hanna had a number of questions to settle with his own employees, and as a rule won their respect and confidence by his fairness and willingness to listen to their claims. He was a firm believer in arbitration between labor and capital, and was active in the organization, in 1901, of the National Civic Federation, a non-partisan organization formed to consider such topics as trusts, tariffs, taxation, etc., becoming its president, and a member of a permanent committee appointed to consider and settle labor disputes.

Han'nay, James, Canadian historian and journalist: b. Richibucto, N. B., 22 April 1842; d. 12 Jan. 1910. After many years of editorial work upon influential Canadian journals, he was chief editorial writer on the Brooklyn, N. Y., *Daily Eagle* (1885-7), and editor of the St. John, N. B., *Daily Gazette* (1888-92), and St. John *Daily Telegraph* (1892-1900). He was also official reporter of the New Brunswick Provincial Parliament. Besides reports of the New Brunswick Supreme Court, he published 'Nine Years a Captive' (1875); 'History of Acadia' (1879); 'The History of the Loyalists' (1893); 'The Story of the Queen's Rangers in the American Revolution' (1883); 'Life and Times of Sir Leonard Tilley' (1897); 'The History of the War of 1812'; 'New Brunswick: Its Resources and Advantages' (1902).

HANNIBAL

Hannibal, Carthaginian soldier: b. 247 B.C.; d. probably 183 B.C. He was the son of Hamilcar Barca (q.v.) and at the age of nine his father made him swear at the altar eternal hatred to the Romans. He was a witness of his father's achievements in Spain; but Hamilcar having fallen in battle in Lusitania, in 228 B.C., and his son-in-law Hasdrubal having been appointed to succeed him, Hannibal returned home. At 22 he returned to the army at the request of Hasdrubal. The soldiers perceived in him the spirit of Hamilcar, and in three campaigns his talents and his courage were so conspicuous that the army, on the murder of Hasdrubal in 221, conferred on him the chief command by acclamation. In 219 B.C. he laid siege to Saguntum, a town which had concluded an alliance with Rome. In eight months Saguntum fell. The Romans, alarmed by this, sent ambassadors to Carthage to demand that Hannibal should be delivered up. The demand being refused, they declared war. Hannibal raised a powerful force, and conceived the design of attacking the Romans in Italy. After providing for the security of Africa, and having left his brother Hasdrubal with an army in Spain, he began his march with 90,000 foot-soldiers, forty elephants, and 12,000 horsemen, traversed Gaul in the depth of winter with incredible rapidity, and reached the foot of the Alps. In nine days he crossed these mountains, probably by the pass leading over the Little St. Bernard. The conquest of the Taurinians and the capture of their chief city encouraged the people of Cisalpine Gaul to join him. These auxiliaries would have been still more numerous had not Publius Scipio approached at the head of a Roman army, which had landed at Pisa. On the banks of the Ticinus the armies engaged, and a charge of the Numidian horse left Hannibal master of the field (218 B.C.) Scipio avoided a second battle, and retreated beyond the Trebia, leaving the strong town of Clastidium in the enemy's hands. Meanwhile Sempronius arrived with a second army, but Hannibal soon provoked his impetuous adversary to an engagement, disposed an ambuscade near the Trebia, and surrounded and destroyed the Roman forces. The Romans lost their camp and 26,000 men. Hannibal now retired to winter quarters among his allies in Cisalpine Gaul; and at the opening of the next campaign (217) found two new armies awaiting his approach in the passes of the Apennines. He determined to engage them separately, and destroy Flaminius before the arrival of his colleague. He deceived him, therefore, by feigned marches, crossed the Apennines, and traversed the Clusian marsh. He then employed every means to compel Flaminius to a battle. He wasted the whole country; feigned a march to Rome; but suddenly formed an ambush in a narrow pass surrounded by almost inaccessible rocks. Flaminius, who followed him, was immediately attacked. A bloody engagement took place near the Lake Trasimenus. Assailed on every side, the Roman legions were cut in pieces. Hannibal now armed his soldiers in the Roman manner, and marched into Apulia, spreading terror wherever he approached. Rome, in consternation, entrusted her safety to Fabius Maximus, the dictator, who determined to exhaust by delay the strength of the Carthaginians. He attacked Hannibal with his own weapons, and hung upon him everywhere with-

out attempting to overtake him, convinced that the Carthaginians could not long hold a desolated territory. Hannibal marched into the plains of Capua, with the design of separating the terrified cities from their alliance with the Romans, and drawing down Fabius from the mountains. But suddenly he found himself in the same toils in which Flaminius had perished. Shut up between the rocks of Formiæ, the sands of Liternum, and impassable marshes, he was indebted for his safety to a stratagem. Having collected a thousand oxen, and fastened burning torches to their horns, he drove the animals at midnight into the defiles guarded by the Romans. Panic-struck at the terrible sight, the Romans abandoned the heights, and Hannibal forced his way through their ranks. Minutius Felix, master of the horse, was then made colleague of Fabius in the dictatorship. Eager for combat, he fell into an ambush at Geronium, and would have perished but for the aid of Fabius. After this campaign the other Roman generals seemed unwilling to trust anything to chance, and imitated the delay of Fabius. Hannibal saw his army slowly wasting away, when the new consul Terentius Varro, an inexperienced and presumptuous man, took the command of the legions. Hannibal had occupied Cannæ, and reduced the Romans to the necessity of risking an engagement (216), Æmilius Paulus, the colleague of Varro, wished to put off the battle, but Varro chose the day of his command, and directed the attack. The Roman army was destroyed, and Hannibal now marched to Capua, which immediately opened its gates. In 215 Hannibal sustained, at the hands of Marcellus, a repulse before Nola—the first check which he had received in the open field—but in 212 B.C. made an important acquisition in the capture of Tarentum. Capua, however, was invested by two consular armies, and was on the point of surrendering. Hannibal marched to Rome, and encamped in sight of the capitol, 211 B.C.; but the Romans were not thus to be discouraged; Capua fell. This success gave the Romans a decided superiority, and nearly all the people of Italy declared in their favor. Held in check by the consul, Claudius Nero, Hannibal could not effect a union with his brother Hasdrubal, who had set out from Spain with reinforcements, but after having passed the Apennines was attacked and defeated by Nero on the Metaurus in 207. Hasdrubal himself fell, and his bloody head was thrown into the camp of Hannibal. The latter then retired to Bruttium, where, surrounded with difficulties, he yet maintained the contest with inferior forces against victorious armies. But Scipio now carried the war into Africa, and Hannibal was recalled to defend his country. He reluctantly embarked his troops, and in 203 left the country which for 16 years he had held in spite of all the efforts of Rome. He landed at Leptis, gained over a part of the Numidians, and encamped at Adrumetum. Scipio took several cities, and reduced the inhabitants to slavery. Pressed by his countrymen to come to a decisive engagement, Hannibal met Scipio at Zama, and was defeated with 20,000 loss. Peace was concluded in 201 B.C. Hannibal, accused by his enemies of stirring up Antiochus the Great to war against the Romans, went to Ephesus, to the court of Antiochus. In the ensuing struggle with Rome, Antiochus was signally defeated, and obliged to

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conclude a peace, one of the terms of which was that Hannibal should be delivered up. Hannibal, again obliged to flee, went to the court of Prusias, king of Bithynia. Prusias, to whom the senate had sent ambassadors to demand the person of Hannibal, was on the point of complying with the requisition, when Hannibal prevented the disgrace by swallowing poison, which he always carried about in his ring.

Hannibal, Mo., city in Marion County, on the Mississippi River, and on the Missouri, K. & T., the Chicago, B. & O., the Wabash, and the Saint Louis, K. & N. W. R.R.'s; about 90 miles northwest of St. Louis and 15 miles south of Quincy, Ill. Hannibal was settled in 1819 and incorporated in 1839. It is situated in an agricultural region. The chief manufactures are foundry and machine-shop products, flour, lumber, cigars, lime, cement, stoves, car-wheels, shoes, and furniture. It is an important trade centre, as it has the advantages of several railroads and steamboat connection with the cities and towns on the Mississippi. A steel bridge for railroad cars and wagons crosses the river from Hannibal to East Hannibal, Ill. The trade is principally in tobacco, lumber, flour, potatoes, ready-made clothing, dairy products, and the city manufactures. It has a free circulating library, public and parish high schools, the Douglas colored high school, and a number of fine public buildings. The city charter of 1845, revised in 1873, provides for the annual election, by the people, of a mayor and a certain number of the members of the school board. The officials of the administrative departments are under the control of the mayor. The electric-light plant is owned and controlled by the city. Pop. (1910) 18,341.

Hanno, hân'ô, or Anno, German mediæval prelate: b. not earlier than 1000; d. Siegburg, near Bonn, 1075. The emperor, Henry III., made him his chancellor, and presented him to the archbishopric of Cologne, to which he was consecrated in 1056. After the death of Henry III., Hanno made himself master of the person of Henry III.'s young son Henry IV., and secured for himself the administration of the empire (1062). His energetic government and his holy life, his paternal care for his see, his zealous reformation of monasteries and foundation of churches, gained him the character of a saint. The hymn in his praise is by some thought to have been written soon after his death; by others about 1183. It is one of the most important monuments of the early German national literature. The best version of it is to be found in Müllenhoff and Scherer's *'Denkmäler deutscher Poesie und Prosa'* (1864).

Hanotaux, Albert Auguste Gabriel, âl-bâr 5-güst gâ-brê-ël â-nô-tô, French politician: b. Beaufort, Aisne, 18 Nov. 1853. He chose for himself the profession of the law, took a scientific course in the Ecole des Chartes, and afterward became a teacher in the Ecole des Hautes Etudes. In 1879 he received an appointment in the French foreign office; in 1881 became a member of the cabinet, and was sent to Constantinople as ambassador in 1885. From 1886 to 1889 he was republican deputy; and in May 1894 received a portfolio in the second Dupuy cabinet. He has published: *'Les Villes Retrouvées'* (1880); *'Origines de l'Institution des*

Intendants des Provinces' (1884); *'Henri Martin, Sa Vie, Ses Œuvres, Son Temps'* (1885); *'Études Historiques sur le XVIe. et le XVIIe. Siècle en France'* (1886); *'Histoire du Cardinal de Richelieu'* (1893).

Han'over, Germany, the northwesternmost province of Prussia, prior to 1866 an independent kingdom. It borders on the North Sea, and has an area of 14,870 square miles. In the south the Harz mountains attain an altitude of over 3,000 feet; the rest of the country is an alluvial plain with a gentle slope to the sea. The Elbe on the northeast boundary, the Ems, and the Weser, with its tributaries, the Leine and Aller, are the principal rivers. Coal and lignite, rock salt, iron, copper, zinc, silver, and gold, are found in the mountainous districts, and there are large peat beds in the north. Over one fourth of the area is arable land, producing large quantities of grain and flax. The keeping of bees is generally practised on the moors, and a breed of superior cattle is raised along the marshy coast land. Forests of hardwood and pine, extensively used in smelting, occupy one sixth of the surface. The manufactures are extensive, and include iron goods, machinery, woolens, linens, cottons, leather, paper, beet-root sugar, beer, spirits, and numerous domestic commodities. Hanover has over 1,500 miles of railroads, numerous canals, and an extensive traffic is carried on at its several ports, among which are Geestemünde, Emden, and Harburg, although practically its chief port is the free city and port of Bremen (q.v.). The capital is Hanover (q.v.). For administrative purposes, the province is divided into the six districts of Hanover, Hildesheim, Lüneburg, Stade, Osnabrück and Aurich. The highest court is in Celle. The province sends 36 members to the Prussian Chamber of Deputies, 10 to the Upper House, and 19 to the German Reichstag. Education is compulsory and free; chief of the higher institutions of learning is Göttingen University. The majority of the inhabitants are Lutheran Protestants. Roman Catholics inhabiting Hildesheim and Osnabrück constitute about one seventh of the population. Hanover was long connected with the Brunswick family, a scion of which, Ernest Augustus, in 1692, became the first Elector of Hanover. He married the daughter of the Elector Palatine, granddaughter of James I., and niece of Charles I. of England. He was succeeded in 1698 by his son George Louis, who in accordance with the Act of Settlement (q.v.), became George I., king of England, at the death of Queen Anne in 1714. The connection with England continued during four reigns, and in 1814 the Congress of Vienna raised Hanover to the rank of a kingdom, George IV. and William IV. thus being kings of Great Britain and of Hanover. On the accession of Queen Victoria, however, by the Salic law, the Hanoverian crown passed to the nearest male heir, Ernest Augustus, Duke of Cumberland, and at his death in 1851 to his son George V. In 1866 Hanover sided with Austria in the Austro-Prussian contest; the capital was occupied by Prussian troops; the king lost his throne, his estates were sequestered, and Hanover was annexed to the Prussian dominions. Pop. (1900) 2,590,336.

Hanover, Mass. (1) Village in the town of Hanover in Plymouth County; on a branch of the New York, N. H. & H. railroad; about

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10 miles east by north from Brockton and 25 miles southeast of Boston. It is the seat of Hanover Academy. It is situated in an agricultural region, and the chief industries are connected with agricultural products. Its chief manufactures are tacks and nails. (2) The town of Hanover contains several villages, and the chief manufactures are shoes, nails, tacks, and dairy products. Pop. of the village is about 420; of the town 2,200.

Hanover, N. H., town in Grafton County; on the Connecticut River, and on the Boston & M. railroad, about 72 miles northwest of Concord. It is situated in an agricultural region and its industries are connected chiefly with farm products and lumbering. It is a summer resort, but is known principally as a college town, being the seat of Dartmouth College (q.v.). It contains also the Mary Hitchcock Memorial Hospital. Pop. (1910) 2,075.

Hanover, Pa., borough in York County; on the Western Maryland and the Pennsylvania R.R.'s; about 32 miles south of Harrisburg. It was settled about 1729 and incorporated in 1813. It is in a rich agricultural section of the State, and nearby are iron-ore mines. The chief manufactures are shoes, machine-shop products, cigars, carriages and wagons, gloves, and leather. Hanover is the commercial centre of a considerable part of York County; the trade is largely in agricultural and dairy products, the manufactures of the borough, and in live stock. The government is vested in a burgess and borough council. Pop. (1910) 7,057.

Hanover, Prussia, the capital of a province, and formerly of the kingdom of Hanover, in an extensive plain northeast of and dominated by Mount Linden, at the confluence of the Ihme with the Leine, 44 miles by rail west by north of Brunswick. It consists of an old town, intersected by the Leine, and of various modern suburbs. The old town is unattractive, but the new quarters are regular and well built. The principal features are the Markt church, of antique appearance; the Kreuz church; Schloss church, a handsome structure, with an altar-piece by Cranach, and some curious relics collected by Henry the Lion; several handsome modern churches; the palace (1636-40, rebuilt since 1817), now a royal Prussian residence; the former palace of King Ernest Augustus (in government occupancy); the royal library; the museum of art and science; the restored town-house (1439-55); the new town-house (formerly palace of George V.); the Kestner museum of antiquities; the provincial assembly house; the Franco-German war monument; the Waterloo monument; various schools, among which is the technical high-school, a remodeled building of great extent, formerly the Welfenschloss (palace of the Gueffs), and the Schloss-Herrenhausen, formerly a royal residence. Trade and industries are important, the latter including railway works, machinery, iron castings, cotton, linen, tobacco, lacquered wares, lamps, glass, chemicals, etc.; breweries and distilleries. The city has electric street railroads.

Hanover is first mentioned in 1163. It joined the Hanseatic League in 1481, and received the Reformation in 1533. It became the residence of the Dukes of Brunswick-Lüneburg, and the capital of the principality in 1636. In 1866 the

kingdom was absorbed by Prussia, and since 1890 the city has held the position of a royal residence and capital. Sir William Herschel, the two Schlegels, and Iffland were born here. Pop. about 255,000, with suburbs, 350,000.

Hanover, Pa., Cavalry Action at. During the Gettysburg campaign Gen. Stuart, commanding the Confederate cavalry, was ordered by Gen. Lee to observe the movements of the Army of the Potomac and harass its rear should it attempt to follow the Confederate army and pass into Maryland. Leaving two brigades south of the Potomac, to guard the passes of the Blue Ridge, Stuart, with the rest of his command, crossed the Potomac at Seneca Creek, 20 miles north of Washington, on the night of 27 June 1863 and, learning that Hooker had crossed the river, marched north by way of Rockville, captured a train of 125 wagons and 400 prisoners between Rockville and Washington, struck the Baltimore & Ohio Railroad at Sykesville and Hood's Mills, and, ascertaining that the Union army was marching from Frederick northward, endeavored to get ahead of it, reaching Westminster at 5 p.m. of the 29th, where he struck a squadron of the First Delaware cavalry, which offered a stubborn resistance, but was finally dispersed, and Stuart, continuing his march, bivouacked at Union Mills, about midway between Westminster and Littlestown. Hearing that Union cavalry was at Littlestown, and that Early was on the Susquehanna, he marched by crossroads for Hanover, on the morning of the 30th and, at 10 o'clock, his head of column reached that place, 16 miles east of Gettysburg, and attacked the rear and flank of Kilpatrick's cavalry division, as it was passing through the town from Frederick and Littlestown, in advance of Meade's central column. His first attack threw the rear of Farnsworth's brigade into confusion, but Farnsworth rallied his men, Custer's brigade was recalled and thrown into action and, after two hours' fighting in and around the town, Stuart was driven back on the Littlestown road, having lost nearly 100 men. Kilpatrick reports his own loss as 59 killed and wounded, and 123 missing.

Stuart was now in a perilous position; he had thrust himself unwittingly between Kilpatrick's cavalry and Meade's main body; Gregg's cavalry division was moving north on his right, but he extricated himself by marching all night over a circuitous route through Jefferson to join Early at York. The latter, however, was on his way to Gettysburg, and Stuart passed almost within sight of him, without knowing it. Finding that Early was not at York, Stuart continued his march to Carlisle, hoping to find Lee's main body there, but found the place occupied by Union troops, and heard that Lee was concentrating at Gettysburg, where by marching night and day, he joined him in the afternoon of 2 July. See GETTYSBURG, CAMPAIGN AND BATTLE OF.

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Hanover College, at Hanover, Ind.; founded in 1828, under the auspices of the Presbyterian Church, as Hanover Academy. It was chartered as a college in 1833. Women have been admitted since 1880. The regular departments are letters, arts, science, law, philosophy, and divinity; also a course for teachers. No charges are made for tuition. In 1910 the college

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reported 16 instructors, 225 students, and about 17,000 volumes in the library. The endowment fund is over \$200,000, and the annual income is about \$15,000.

Hanover Court House, Engagement Near. On 21 May 1862 Gen. McClellan had marched the Army of the Potomac up the York peninsula to the banks of the Chickahominy, 7 to 12 miles distant from Richmond. On the 26th he heard that R. H. Anderson's Confederate brigade and Stuart's cavalry were near Fredericksburg, and that another body, Branch's brigade, was in the vicinity of Hanover Court House, 17 miles north of Richmond, to his right and rear. These bodies threatened his communications, and were in position to reinforce Jackson, in the Shenandoah valley, or to oppose McDowell, whose advance was then eight miles south of Fredericksburg. Gen. Fitz-John Porter was ordered to clear the enemy from these positions and destroy the bridges over the South Anna and Pamunkey rivers. Warren's small brigade had been already detailed to destroy the bridges, had destroyed all means of communication over the Pamunkey as far as Hanover Court House, and was then posted at Old Church. On the morning of the 27th Warren moved toward the court house, on a road running parallel to the Pamunkey. Porter left New Bridge at 7 A.M. with Morell's division and Emory's cavalry brigade and, marching by way of Mechanicsville northward toward the court-house, about noon his cavalry and the Twenty-fifth New York infantry, encountered a portion of Branch's brigade, supporting two pieces of artillery, attempting to hold the road leading to the court-house. A Union battery was brought up and Butterfield's brigade deployed, which charged and drove the Confederates from the field, capturing one gun. A part of the Twenty-fifth New York was captured by the Confederates. Supposing that the Confederates had all retreated in the direction of Hanover Court House, Porter pursued, the cavalry, under Emory, and the Seventeenth New York, overtaking and capturing a large number of the Twenty-eighth North Carolina. Upon nearing the junction of the Ashland and the Court House roads, a part of Martindale's brigade was sent toward Ashland to guard that flank against an approach from Richmond and to destroy the railroad running to that city. Near Peake's station Martindale ran into Branch's brigade, was immediately attacked, and was driven back some distance. When Porter, whose advance had reached Hanover Court House, heard that Martindale had been attacked, he faced about his entire column, reached Martindale, struck Branch on his left and rear, and routed him. Branch retreated to Ashland and formed a junction with Anderson's brigade, which had fallen back from McDowell's front. After destroying the railroad in several places and opening the way for McDowell's advance from Fredericksburg, Porter returned to his old camps on the night of the 29th. The Union loss in the engagement of the 27th, was 62 killed, 223 wounded, and 70 missing. The Confederate loss was 73 killed, 192 wounded, and 730 prisoners, of whom about 150 were also wounded. Consult: 'Official Records,' Vol. XI.; Webb, 'The Peninsula'; 'McClellan's Own Story'; Allan, 'The Army of Northern Virginia'; The Century Company's

'Battles and Leaders of the Civil War,' Vol. II. E. A. CARMAN.

Hanover, Treaty of, an alliance between England, France, and Prussia, made in September 1725, for the purpose of mutual assistance, in opposition to that between Austria and Spain.

Hansa, or Hanse. See HANSEATIC LEAGUE.

Hanseatic (hän-sē-at'ik) League, Hansa, or Hanse, a confederacy of certain cities of northern Germany for mutual protection, especially in matters of commerce; for the extension of trade, and of rights and immunities received from sovereigns, and which had suffered curtailment. The union was formed in the 13th century, at a time when sea and land swarmed with pirates and robbers, and German trade, no longer guarded by the privileges of armed attendants, was exposed to many dangers, while government had degenerated into a power for extorting taxes without giving protection.

The first alliances known to have been concluded are those between Hamburg and Lübeck (1241 and 1255) to keep open the road across Holstein connecting the North Sea with the Baltic, and between Lübeck, Rostock, and Weimar in 1259 for defending themselves against the pirates. About the same time a similar league was concluded between the Westphalian towns, Münster, Dortmund, Soest, and Lippstadt. When a wider union came to be formed for like purposes, the name of *Hansa*, signifying a league, which was at first applied to any such confederacy, survived exclusively as the name of that influential league. During its most flourishing period it embraced 90 towns, scattered over the whole length and breadth of Germany, including Holland. Its organization was very loose, the towns of which it was made up being at first divided into three and, after the 16th century, into four provinces, each with a chief town. These divisions had, however, little more than a geographical significance. The town of Lübeck, which already held an important rank, from the fact that it was the highest court of appeal for all those towns which were governed by the Lübeck law, was recognized as the chief town of the league. Here assembled the deputies of the other Hanse towns to deliberate on the affairs of the confederacy; the decrees of the diet had no effect unless they received the sanction of the separate towns.

In the 14th century the league everywhere attained a high political importance, and gave rise to the development of that commercial policy which has since become intimately connected with all political relations, but of which the sovereigns of that time had little idea. Kings and princes were, in reality, more dependent on the league than it was on them. The extensive carrying trade of the Hanseatic League was a great source of wealth and at length there was no mart in Europe which was not gradually drawn within the circle of its influence. England, Denmark, and Flanders concluded treaties with the league for the extension of their commerce. It undertook to provide for the security of commerce on the Baltic and North seas. In the country under its immediate influence it constructed canals, and introduced a uniform system of weights and measures.

But the prosperity of the Hanse towns was naturally dependent on the continuance of the circumstances which gave rise to it, and when circumstances changed, the league was destined to decline. When the routes by land and sea were no longer insecure; when princes learned the advantages of trade to their own states, and turned their attention to the formation of a naval force of their own, and the encouragement of navigation; when the inland members of the confederation perceived that the great seaport towns had a separate interest of their own, and used them principally to promote their own ends; then the dissolution of the Hanseatic League was evidently approaching. There remained at last as active members of it only Hamburg, Lüneburg, Lübeck, and the towns in the neighborhood (Wismar, Rostock, Greifswald, Stralsund, whose interests were identified with those of Lübeck. The league existed no longer as a political power, but merely as a loose association of towns for commercial purposes.

In England, during the reign of Queen Elizabeth, the league lost its privileges by its refusal to grant complete reciprocity. About 1614 there remained only 14 towns which contributed to the support of the league, and had a voice in the management of its affairs. These were: Lübeck, Wismar, Rostock, Stralsund, Greifswald, Stettin, Danzig, Magdeburg, Brunswick, Hildesheim, Lüneburg, Hamburg, Bremen, and Cologne. The Thirty Years' war, which destroyed the prosperity of the German towns generally, gave the death-blow to the league. At the diet of 1629 it was entrusted to the cities of Lübeck, Bremen, and Hamburg to consult for its general interests, and in 1630 these towns concluded among themselves a closer union, which was renewed in 1641. After the Peace of Westphalia (1648) repeated but vain attempts were made to bring the league together again, and a last diet was held in 1669. Hamburg, Lübeck, and Bremen still retain their independence, and now form separate constituents of the German empire.

Hansen, hân'sën, Gerhard Henrik Armauer, Norwegian physician: b. Bergen, Norway, 1841. He was educated during boyhood in the cathedral schools of his native city, afterward entered upon the study of medicine, and was eventually appointed resident physician in the Rigs Hospital of Christiania. He was afterward government medical officer for the Lofoten fisheries, but did not reach the field of his fame until he was appointed in 1868 to the post of assistant physician at the Bergen Leper Hospital. From this time forth he devoted himself to the study of leprosy, and following the lines laid down by Virchow, traveled from one to another university of Europe, continuing his investigations. On his return to Norway the Medical Society of Christiania voted a sum of money to pay the expenses of his further researches. He at last was enabled to demonstrate the fact that leprosy was contagious. Continuing his investigations he discovered at last the leprosy bacillus in unstained preparations. Later it was stained and became known as Hansen's bacillus (1873). He was not successful in employing the bacillus for purposes of inoculation with a preventive object; but on the basis of his contagion theory, legislation has

been enabled to check to a considerable extent the spread of the disease.

Hansom, or Hansom Cab. See CARRIAGE.

Han'son, Alexander Coutee, American journalist and politician: b. Maryland 1786; d. 1819. After being graduated at St. John's College, Annapolis, he adopted journalism as a profession, and in 1812 his office was wrecked by a mob on account of an article attacking the Madison Administration which appeared in the 'Federal Republican,' of which he was editor. He was elected to the lower house of Congress in 1813, and from 1817 until his death had a seat in the Senate.

Hanus, Paul Henry, American educator: b. Hermsdorf-unter-dem-Kynast, Prussia, 14 March 1855. He came to the United States in childhood, was educated at the University of Michigan and has been professor of the history and art of teaching at Harvard from 1891. He has published 'Elements of Determinants' (1886); 'Geometry in the Public School' (1893); 'Contemporary Educational Problems' (1899).

Hap'good, Isabella Florence, American author and translator: b. Boston, Mass., 21 Nov. 1851. She has written 'The Epic Songs of Russia'; 'Russian Rambles,' etc., and is widely known by her translations from the Russian of Tolstoy, Gogol, etc., and she has also made important translations from the French and Spanish.

Hapgood, Norman, American journalist: b. Chicago 28 March 1868. He was graduated from Harvard in 1890, and the Harvard Law School in 1893, and has since become well known as a keen, discriminating essayist and dramatic critic. He has published 'Literary Statesmen and Others' (1897); 'Daniel Webster' (1899); 'Abraham Lincoln' (1899); 'The Stage in America' (1901).

Hapsburg, häps'bërg (Ger. häps'boorg) (properly HABSBUERG), the imperial house of Austria-Hungary, so named from the ancestral castle, in the canton of Aargau, Switzerland, on the right bank of the Aar. The castle was built in the 11th century by Bishop Werner, a descendant of Ethico I., a count of Alemannia, in the 7th century. It stands on the Wüpelsberg, a steep rocky situation, whence the name *Habichtsburg* (Hawk's Castle). The proprietors of Hapsburg became at a later period counts of Hapsburg and gradually extended their territories. Werner II., who died in 1096, is said to have been the first to assume the title. After the death, about 1232, of Rudolph II., the fourth in succession from Werner II., the family divided into two branches, the founder of one of which was Albert IV., and that of the other Rudolph III. The latter is known as the Hapsburg-Lauffenburg line, which became extinct in the direct male line in 1408. A younger son of Rudolph, called Eberhard, founded the Kyburg branch of the Hapsburg-Lauffenburg line, which did not become extinct till 1415, and Godfrey, a grandson of Rudolph, who settled in England in the 13th century, there became the founder of the Fielding family, to which the Earls of Denbigh belong, and of which the novelist Fielding was a member. The line descended from Albert IV. is that to which the historical celeb-

erty of the house is almost entirely due. In 1273 Rudolph, the son of Albert IV., was chosen emperor of Germany or Holy Roman Emperor. He is the founder of the reigning house of Austria, which is of the line of Hapsburg-Lorraine. From Rudolph to Charles VI. the Austrian monarchs were of the Hapsburg male line. Maria Theresa, who succeeded Charles VI., married Francis Stephen of Lorraine, who in 1745 was chosen Emperor of Germany. Francis II., the third emperor of Germany of the line of Hapsburg-Lorraine, was the last who bore that title till the establishment of the new empire, the last of the so-called "Holy Roman Emperors." He changed it in 1806 for that of Emperor of Austria, and the present imperial house of Austria continues to represent that line. From the Emperor Rudolph was also descended a Spanish dynasty which began with the Emperor Charles V. (Charles I. of Spain), and terminated with Charles II. in 1700.

Haraforas, or **Alfures**, names applied in Celebes, the Moluccas, Mindinao, and the adjacent islands to certain native tribes, particularly of the interior, which differ from the Malays, and have been thought to be perhaps pre-Malayan aborigines.

Hara-kiri, *hār'a-kīr'ē*, or **Seppuku**, a mode of inflicting death upon themselves allowed in Japan to criminals of the Samurai or two-sworded class as more honorable than public execution. It consists in cutting open the body so as to disembowel it, by means of a wound made with one sword perpendicularly down the front and another with the other sword horizontally. Till recent times Japanese of the two-sworded class who had been guilty of any crime frequently resorted to this mode of killing themselves before their guilt had been proved, and it was regarded as honorable in them to do so, indicating a strong sense of shame. Sometimes they were commanded to put themselves to death in this manner. Consult: Mitford, 'Tales of Old Japan' (3d ed. 1876); and Chamberlain, 'Things Japanese' (1891).

Harald. See **HAROLD**.

Haran (Assyrian *Kharranu*, road), the name of a district of northern Mesopotamia and of a town situated therein, on the stream called Jullab, southeast of Edessa. The name is probably derived from the fact that at this town the trade-routes from Media, Assyria, and Babylonia met to proceed along the same highway to the coast of Cilicia. Haran is mentioned in the Old Testament in Gen. xi. 31-32, and Ezekiel xxvii. 23. To the Assyrians it was a strategic post of great importance. In the inscriptions references to it appear as early as the reign of Tiglath-pileser I. (about 1100 B.C.). An extensive commerce centred here. To the Greeks and Romans it was known as *Carræ* (Gk. *καρραι* or *Χάρρα*). Crassus, the Roman commander, was here defeated and slain by the Parthians during his eastern expedition (53 B.C.), and Caracalla assassinated by the soldiery of Macrinus (217 A.D.). It was of importance even in the time of Arab supremacy, but the geographer and historian Abulfeda (d. 1331) speaks of it as in ruins in his day. It was the seat of an episcopal see in the 4th century. Consult Metz, 'Geschichte der Stadt Harran' (1892).

Harar, or **Adari**, a Semitic dialect spoken in the Abyssinian province of Harar (q.v.). It includes some Hamitic words. For an account of it, consult an article by Prätorius in the 'Zeitschrift der Deutschen Morgenländischen Gesellschaft,' Vol. XXIII. (1869).

Harar, **Harrar**, or **Adari**, capital of the province of Harrar in eastern Abyssinia, south of the Gulf of Aden, about 180 miles from the coast. It is situated at an elevation of 5,500 feet above the level of the sea. The surrounding district is very fertile and produces chiefly coffee. Cotton is also a large crop, and excellent in quality. There is a brisk trade in gums, ivory, and fruits. Harar was formerly the capital of a small, independent country, ruled by an emir. In 1876 it became a dependency of Egypt, and later was under Italian protectorate. After the Italian defeat at Adowa in 1896, it passed with the province to Abyssinia. Its first European visitor was Sir Richard F. Burton, who obtained admission there as an Arab in 1855, and described it in his 'First Footsteps in East Africa, or An Exploration of Harar' (1856). Pop. about 40,000. Consult further the 'Bulletin de l'Etat Major-Général de l'Armée Egyptienne' (1876), and Paulitschke, 'Harar, Forschungsreise nach den Somal- und Gallaländern' (1888).

Harar, **Harrari**, or **Harrur**, the most easterly of the Abyssinian provinces; bounded on the east and north by British and French Somaliland, and on the south and southeast by British East Africa and Italian Somaliland. The country is a table-land, with a maximum elevation of nearly 11,000 feet. Previous to the insurrection of the Mad Mullah (q.v.) it was a part of the Egyptian Sudan. It was captured by Italy in 1891, but after the severe defeat of the Italian forces by the Abyssinians at Adowa 1 March 1896 it passed to Abyssinia. The foreign trade of Abyssinia is conducted largely through Harar.

Haraucourt, **Edmond**, French poet and novelist: b. Bourmont (Haute-Marne) 1857. His first work appeared in 1883 and was entitled 'La légende des sexes, poëms hysteriques.' A collection of his verses was published in 1891. He also published 'Amis' (1887); 'Shylock' (1889); 'Don Juan' (1894); 'Elizabeth' (1894). He was awarded the Academy prize for his poem 'Les Vikings' (1890).

Harbaugh, **Henry**, American clergyman of the German Reformed Church in America: b. near Waynesborough, Pa., 24 Oct. 1817; d. Mercersburg, Pa., 28 Dec. 1867. He studied at Franklin and Marshall College (Mercersburg) and at the Mercersburg Seminary, was ordained in 1843, and in 1843-64 held pastorates successively at Lewisburg, Lancaster, and Lebanon, Pa. In 1864 he was appointed professor of theology in the Mercersburg Seminary. He was one of the leading exponents of the "Mercersburg theology" (q.v.), and belonged to the high-church school of his denomination. From 1850 to 1866 he was editor of the 'Guardian,' and in 1866-7 of the Mercersburg 'Review.' Besides a collection of poems in the 'Pennsylvania Dutch' dialect, he published: 'Heaven' (1843-53); a 'Life of Michael Schlatter' (1857); 'Christological Theology' (1864), and other works.

HARBEN — HARBOR

Harben, William Nathaniel, American novelist: b. Dalton, Ga., 5 July 1858. He has contributed many short stories to magazines, and his published novels include: 'White Marie' (1891); 'Almost Persuaded' (1890); 'A Mute Confessor' (1891); 'The Land of the Changing Sun' (1894); 'From Clue to Climax' (1896); 'The Caruthers Affair' (1898); 'The North Walk Mystery' (1899); 'The Woman Who Trusted' (1901); 'Westerfelt' (1901); 'Abner Daniel' (1902); 'The Substitute' (1903). He is also the author of 'Northern Georgia Sketches' (1900).

Harbin, Manchuria, a city on the Sungari River at the point where the Manchurian branch of the Trans-Siberian railway crosses that stream. The Chinese eastern branch of the railway, running to Dalny (Talienwan) (q.v.) and Port Arthur (q.v.) begins here. Prior to the Russian occupation in 1900 (see MANCHURIA), Harbin was a small Chinese village. On account of its geographical and strategical position it was chosen as a military centre, and very quickly it became also headquarters for railway and governmental affairs. Commerce and manufacture have also greatly developed, although not originally considered in the promotion of Harbin; and here more than elsewhere Russia gradually asserted its intention of becoming an active industrial force in the Orient. Every system of protection that could be devised has been employed by the government to advance its commercial prestige. Harbin consists of the old town, three miles distant from the central dépôt; Prestin, the river town, the present commercial portion; and the administration town, about the railway. Only Russians and Chinese are allowed to hold land, construct buildings, or enter any permanent enterprise. The territory for many miles surrounding has been secured so as to make it impossible for any foreign interest or influence to obtain a foothold or profit near to the city. The principal railway engineer is the chief administrative official. A census of 1903 showed a population of 60,000 exclusive of soldiery; of these all but 700 were Russians.

Harbor, a recess or inlet of the sea, a lake, or other large body of water, either landlocked or protected from winds and waves by artificial means, so as to be a secure haven for vessels in all weathers. In selecting or constructing a harbor regard is also had to convenience in loading and unloading vessels. The two chief classes are harbors of refuge and commercial harbors. Often the latter are merely tidal, only to be entered by vessels as the tide serves, and where with the tide they rise and fall. Harbors of refuge or shelter are accessible in all conditions of tide. Sometimes there is a combination of the harbor or haven with a capacious protected roadstead outside of it, as at Cherbourg, France, and other places.

Construction.—In the construction of harbors the great desiderata are sufficient depth of water and perfect security for the vessels likely to frequent them, together with the greatest possible facilities for ingress during any weather, while the chief obstacles to be surmounted are the action of the waves upon the protecting piers and breakwaters, and the formation of sand-

banks and bars; which diminish the depth of water at the entrance and also within. All good harbors should possess the following characteristics: A deep, broad entrance-channel, which can be kept by ships of all kinds in all sorts of weather; an ample anchorage, free from rocks and shoals, with good holding-ground, and protected from winds and waves. Commercial harbors should also be supplied with adequate constructions and appliances for loading and discharging vessels.

Ground-plan.—In designing the ground-plan of harbors, some rules should be kept in view: (1) the entrance should always be kept seawards of the works of masonry, care being taken that the direction of the piers does not throw the sea across the entrance; (2) there should be a good "loose," or point of departure free of rocks or a lee shore; (3) spending-beaches inside should be provided to allow the waves that pass in to break and spend themselves (a harbor-basin surrounded with vertical quay-walls becomes a "boiling pot"), but this is a point frequently overlooked by engineers; (4) the relation of the width of entrance to the area of a harbor should be a matter of careful study, as upon this depends the tranquillity of the interior.

Anchorage.—The anchorage of a harbor should be large enough to afford shelter to the maximum number of vessels seeking it. The space required by a vessel at anchor is, roughly, a circle whose radius is six times the depth of water plus the vessel's length. First-class harbors should have a depth of at least 40 feet, to admit and give secure anchorage to the largest ships now existing. An available depth of 25 feet is sufficient for ordinary transatlantic freight and passenger steamers. Coasting vessels rarely have a draft of more than 20 feet.

Natural Harbors.—Some of the best known natural harbors are those of Queenstown, Ireland; Rio de Janeiro, Brazil; Portland, Me.; Boston, Mass.; Narragansett Bay, R. I.; New York, N. Y.; Old Point Comfort (Norfolk), Va.; Port Royal, S. C.; Havana, Cuba; San Francisco, Cal.; Puget Sound, Wash.; King George's Sound, and Princess Royal Harbor, in southwestern Australia.

Artificial Harbors.—These are as old as naval warfare, and may almost be said to date from the birth of commerce. The Phœnicians protected their little strip of the Levant coast. Tyre and Sidon were well provided with harbors, having effectual breakwaters, mainly built of loose rubble. Carthage, Greece, and Rome, each in its own way, utilized their harbors for commercial and warlike purposes. That of Carthage was artificial, those of Greece but slightly so, nature having provided so many navigable inlets that little remained to be done by man. The great harbors of Rome, constructed in the solid and workmanlike manner of her practical race, may still be studied with profit, for the coasts of Italy yet show how well the Romans understood both the principles and the practice of this branch of marine engineering. One of their finest and most complete constructions of this nature was the port of Ostia, at the mouth of the Tiber, now more than two miles inland. The Romans were distinguished in harbor-making by the open or

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arched mole or enclosing work, which gave full play to the currents, preventing the deposit of sand or mud. "The foundations of Nero's port," says Addison, "are still to be seen. It was altogether artificial, and composed of huge moles running round it, in a kind of circular figure, except where the ships were to enter." Harbor-making came to an end with the decay of commerce and civilization consequent upon the fall of the empire, to be revived by the Italian republics of the Middle Ages. The rich traffic of Venice and Genoa soon led to the construction of suitable ports at those places, and the moles of the latter city and the works in the lagoons of Venice remain to this day. France was next in the field, embanking, protecting, and deepening the mouths of the rivers along her north-western shores, as at Havre, Dieppe, Dunkirk, etc. In 1627, during the siege of Rochelle, Métézeau constructed jetties of loose rubble-stone, to prevent access to the city.

British Harbors.—Great Britain, whose ocean commerce is of comparatively recent date, lagged far behind her Continental rivals. With few exceptions her ports were absolutely unprotected, or rather uncreated; and this state of things continued until late in the 18th century. Two of the few exceptions were Hartlepool, where a harbor was formed about 1250, and Arbroath in 1394; in the 17th century at Whitby and Scarborough rough piers were thrown out, protecting the mouth of the port; at Yarmouth a north jetty, and subsequently a south one, were formed; an ancient mole existed at Lyme Regis; but the chief efforts of the early English engineers were directed against the shoals and waves of Dover. When, however, John Smeaton (q.v.) rose to vindicate the engineering talent of England, things took a different turn, and now few countries surpass Great Britain in the number of artificially improved commercial harbors. In Great Britain the construction and regulation of harbors is primarily under authority of the crown, but Parliament now usually names commissioners and boards with powers of ownership or management specially conferred by that body. All individual owners are required to manage harbors subject to the rights of public use, while final government control of them is practically absolute.

Harbors in the United States.—In this country all harbor-making in a public sense has been done since the beginning of the 19th century. The date of its first undertaking is 1802, when the project of building public piers in Philadelphia received government aid by an appropriation of \$30,000. Twenty years later, for a harbor of refuge in Delaware Bay, \$22,700 was appropriated; and in 1826 appropriations aggregating about \$150,000 were made for river and harbor improvements at many places. From this time river and harbor bills have steadily increased the Congressional appropriations, which now amount in the aggregate to hundreds of millions.

Federal control over the ports of the United States, including all the important harbors, is exercised under the constitutional power of the government to regulate commerce; but in most of the details of harbor management—such as ownership and use of wharves, docks, warehouses, and the provision and disposal of facilities generally—management is left to the States.

Pilot laws, the appointment of harbor-commissioners, harbor-masters, etc., and all other harbor regulations are made and enforced by the States, subject in certain things—as, for example, quarantine rules—to the jurisdiction of the Federal government. Consult: Rennie, 'Harbors'; Stevenson, 'Design and Construction of Harbors'; Moore, 'History of the Fore-shore and the Law Relating Thereto'; Harcourt, 'Harbors and Docks'; Birdseye, 'Laws of the State of New York' (Navigation Law and New York Harbor); United States Revised Statutes, Secs. 5,244–5,255. See **BREAKWATER**; **DOCKS AND DOCK YARDS**; **JETTIES**; **LIGHT-HOUSES**.

Harbor Grace, Newfoundland, a port of entry on Conception Bay, 27 miles west by north of St. John's, 84 miles by rail. It has a large but exposed harbor, with an inner secure port, a patent slip, and a lighthouse with a revolving light. It is the see of a Roman Catholic diocese with a handsome cathedral and convent. Its commerce is second to that of St. John's.

Harbor Seal, or **Hair-seal**, the common small seal (*Phoca vitulina*), once common on both sides of the North Atlantic, down to Virginia in the United States, but now only occasionally seen south of Cape Cod. See **SEAL**.

Harbor Springs, Mich., village, county-seat of Emmet County; on Little Traverse Bay, an arm of Lake Michigan, and on the Grand Rapids & I. R.R. The landlocked harbor is much used by lumber vessels. The village is in a part of the State where the large forests make lumbering the chief industry. The chief manufactures are flour and lumber. The cool climate in summer makes Harbor Springs a favorite resort during July and August. Pop. (1910) 1,805.

Harby, Isaac, American dramatist and journalist: b. Charleston, S. C., 1788; d. New York 14 Nov. 1828. In 1822 he conducted the *Charleston City Gazette* and later the *Mercury*. His plays were 'The Gordian Knot'; 'Alexander Severus'; and 'Alberti.' He was vice-president of the Hebrew Orphan Asylum of Charleston and leader of the reformed movement among the Jews of that city—the first of its kind in the United States. In 1828 he removed to New York and engaged in journalism, until his death the same year.

Harby, Levi Charles, American naval officer; b. Georgetown, S. C., 21 Sept. 1793; d. Galveston, Tex., 3 Dec. 1870. While a midshipman in the United States navy in 1812, he was taken prisoner and confined in Dartmoor Prison, England, until the end of the war. He served under Gen. Jackson in the Creek war, and participated in the Texas struggle for independence and the conflict with Mexico. Subsequently he fought in South America under Bolivar. On the secession of South Carolina, he resigned his commission in the United States service and joined the Confederate forces as commander of the fleet at Sabine Pass.

Harcourt, här'koort, Sir William George Granville Venables Vernon, English statesman: b. 14 Oct. 1827; d. Malwood, Hampshire, 1 Oct. 1904. He began his education in a private school at Salisbury, and then studied at Trinity College, Cambridge, whence he was

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graduated with high honors in 1851, receiving the degree of M.A. He then studied law, being called to the bar in 1854, and in 1866 he became queen's counsel. In 1858 he made an attempt to enter Parliament as an Independent Liberal, but was defeated. During these years he wrote largely for the 'Saturday Review' and other journals, and in 1860 attracted considerable attention by a series of letters on international law and kindred subjects contributed to *The Times* over the signature of "Historicus," and which he continued throughout the American Civil War. In 1868 he entered Parliament as Liberal member for Oxford, serving his constituents at that post till 1880, when he was defeated for re-election. He was, however, selected to represent Derby and continued in that position until 1895, when, having been defeated at the general election, he found a seat in West Monmouthshire. In 1869 he was elected Whewell professor of international law at Cambridge; at the same time he was appointed a member of the royal commissions for amending neutrality laws and for amending the naturalization laws. He was appointed solicitor-general in 1873, but held the office only three months, and in the same year was knighted by the queen. Although he had not supported Mr. Gladstone during his retirement from power, yet upon that statesman's return to the office of prime minister in 1880, he was appointed secretary of state for the home department, continuing in that capacity until the Liberal party went out of power in 1885. At that time his name became famous through his connection with the 'Ground Game Act' (1880), the 'Arms (Ireland) Act' (1881), and the 'Explosives Act' (1883), the last one being pushed through all its stages in the shortest time on record. In 1884, his bill for unifying the municipal administration of London was introduced. Upon the return of the Liberals to power in 1886, he was made chancellor of the exchequer, holding that position only a short time, as the fortunes of politics again took him from office. During the years 1880 to 1892 he was Gladstone's lieutenant in political life, and his services were of immense value, especially on account of his brilliant oratorical powers. Again in 1892 he was made chancellor of the exchequer, acting as such until 1895. It was during this term, in 1894, that he introduced and carried his famous tax budget, in which the income tax became more graduated and the "death duties" on real and personal property were equalized, thereby giving the government much aid in solving their financial problems. Upon Gladstone's retirement in 1894, Harcourt was looked upon as his successor, but his title was ignored and Lord Rosebery appointed in his stead. Sir William then became leader of the Liberals in the House of Commons, and it became evident that he and the new prime minister did not agree as to party policy, and, though their differences were from time to time patched up, it was clear in his defeat at Derby in 1895 that the party was divided on many issues, and the effect was then seen of Sir William's Local Veto Bill, not only in the utter rout of the Liberals, but in the setback given to temperance legislation. From 1895 to 1900 he represented West Monmouthshire in the House of Commons, but the task of leadership of the Liberal party became particularly

onerous because of the tendency of the various sections to break away from control. In the session of 1896, against the overwhelming Unionist majority, he scored several successes, but was severely criticised by his own party for concurring in the majority report of the special committee, of which he was a member, appointed in 1897 to investigate the Jamieson Raid and the British South Africa Company. The internal dissensions in the Cabinet became more marked as time went on, and the divided counsels manifest among the leaders of the Liberals led to his decision to retire from the leadership of the party on the floor of the House of Commons, and in 1898 with John Morley he retired from active work and thereafter sat as a private member. As a private member, he no longer restrained his attacks on the government, paying not the least deference to Liberal imperialism. He actively opposed the government's policy with regard to the sinking fund, their attitude in the negotiations with the Transvaal, and the financing of the South African war, and throughout the war he lost no opportunity in criticising the South African developments. In 1898-1900 he became prominent, both on the platform and in his letters to *The Times*, in advocating active measures against ritualistic practices in the Established Church. The general election of 1900 found him full of fight, favoring the official Liberal programme as distinct from that of the imperialistic section which favored the return of Lord Rosebery to the leadership, and when the new Parliament met his attitude signified that his former claims would not be dropped. Sir William had refused twice to enter the peerage, and in a speech delivered at the National Liberal Club on 28 July, after announcing his determination to retire at the close of the session, said: "It is not because I am weary of the fight or am lukewarm in the cause that I intend to retire. It is because I do not think it for the public advantage that persons should attempt to fulfil duties that they are unable to perform." And yet after this announcement he vigorously attacked Joseph Chamberlain, whose weightiest political antagonist he was, for his fiscal proposals, in a lengthy speech, delivered in his familiar Homeric style. It has been written of him: "Sir William Vernon-Harcourt is one of the few public men whose addresses out of Parliament are printed in full by the London journals. His reputation has steadily improved while his party has been in the minority, and his caustic wit, polished satire, and brilliant epigrams have stung and irritated the conservative peers time and again. He has Lord Beaconsfield's trick of giving phrases the stamp of his own originality, so that there is no one on the Liberal side whose speeches are quoted more frequently. It has been aptly said that Sir William's distinguishing characteristic is his cleverness. His platform speeches are not only rattling and rollicking, but are generally brimful of witty and happy phrases. He has a great gift of lucid exposition and on rare occasions, when he condescends to be serious, commands a flexible and sinuous prose." Sir William Harcourt was married in 1859 to Lady Thérèse Lewis, widow of Sir George Cornwall Lewis, and daughter of T. H. Lister, and again in 1876 to Mrs. Elizabeth Ives, widow of J. P. Ives, and daughter of John Lothrop Mot-

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ley, the historian, and at one time United States minister in London.

Hard Labor, in law, compulsory work, mechanical or other, sometimes judicially imposed upon criminals in addition to imprisonment or other punishment. It is a provision of statute law both in this country and Great Britain. Its first English adoption was secured through the demand for some adequate penalty in cases where penal servitude and transportation were for any reason inexpedient. In the United States the punishment of hard labor (which, however, is generally looked upon by humanitarians and sanitarians as being rather a healthful and merciful privilege) can only be imposed by a court on the authority of statute, the mode of applying the punishment being in some cases prescribed by State or Federal laws, and in others left to prison regulation.

Hardecanute, hār-dē-ka-nūt', **Harthacnut**, or **Hardacnut**, king of England and Denmark; son of Canute: b. about 1019; d. 8 June 1042. At the time of his father's death in 1035 he was in Denmark, where he was immediately recognized as king. His half-brother, Harold, however, who happened to be in England at the time, laid claim to the throne of that part of their father's dominions. For a time the mother of Hardecanute succeeded in holding Wessex in his name, while Mercia and Northumbria were held by Harold, such an allotment having been made by a witenagemote held at Oxford. Hardecanute was about to make an armed descent upon England, when Harold died (1040), and his brother peacefully succeeded him. He reigned till 1042, but his reign was not marked by any important event. He left the government almost entirely in the hands of his mother and the powerful Earl Godwin (q.v.), while he gave himself up to feasts and carousals.

Har'dee, **William Joseph**, military officer: b. Savannah, Ga., 10 Oct. 1815; d. Wytheville, Va., 6 Nov. 1873. He was graduated at West Point in 1838; served with distinction in the Mexican War; and in the Civil War entered the Confederate army with the rank of colonel. He commanded a corps at Shiloh; and was promoted lieutenant-general in 1862. At Perryville he commanded the left wing of the Confederate army and in December 1864 defended Savannah against General Sherman.

Harden, **William**, American historian: b. Savannah, Ga., 11 Nov. 1844. He left his studies in the schools of Savannah to join the Confederate army, serving throughout the Civil War in the 54th Georgia infantry and in the signal corps. After the war he studied law and was admitted to the bar in the early 70's. He was assistant librarian of the Georgia Historical Society from 1866 to 1869, when on 5 August he was appointed librarian, a position he still occupies. He has been a member of the board of managers of Telfair Academy of Arts and Sciences since 1882, and custodian since 1894; organizer and secretary of the Georgia Society of the Sons of the Revolution since 1891; and was a Democratic member of the Georgia House of Representatives from 1900-4. Has written much on historical subjects in magazines and journals.

Hardenberg, **Georg Friedrich Philipp von**, gā-örg frēd'rih fēlēp fōn hār'dēn-bērg, "NOVALIS," German poet: b. Wiedenstadt, Prussia, 2 May 1772; d. Wessenfels, Prussia, 25 March 1801. He made himself well acquainted with law, natural philosophy, mathematics and philosophy, but was most eminent for his poetical talents. In the works of "Novalis" there is a singular mixture of imagination, sensibility, religion and mysticism. He was the gentlest and most amiable of enthusiasts. His novel, 'Heinrich von Ofterdingen', was left unfinished. His 'Hymns to Night' and the 'Geistliche Lieder' are greatly admired. With the Schlegels and Tieck he assisted in founding the romantic school in Germany. Consult: Schubarth, 'Novalis Leben' (1887); Bing, 'Friedrich von Hardenberg' (1893).

Hard'hack, or **Steeple-bush**, an erect species of American *Spiraea* (*S. tomentosa*), common in pastures and low grounds, and celebrated for its astringent properties, which cause it to be used medicinally. It is distinguishable by the dense woolly tomentum, which covers its stem and the underside of its leaves; and bears in late summer "a compact, steeple-shaped panicle of peach-blow pink."

Har'die, **James Allen**, American soldier: b. New York 5 May 1823; d. Washington, D. C., 14 Dec. 1876. He was graduated from the United States Military Academy in 1843, entered the artillery, during the Civil War served on the staffs successively of Generals McClellan and Burnside, was judge-advocate-general of the Army of the Potomac on Hooker's staff, became brigadier-general of volunteers in 1862, and inspector-general with rank of colonel in 1864. He was brevetted major-general, United States army, in 1865. His writings are largely confined to military reports.

Hardie, **James Keir**, English labor leader: b. Lanarkshire 15 Aug. 1856. He worked in the coal mines until 1879, when he was blacklisted on account of his activity in organizing the miners; he was then appointed paid secretary of the miners' union. In 1886 he organized the Ayrshire miners, and in 1887 attended his first Trade Union Congress. He was one of the founders of the Independent Labor Party, and was elected member of Parliament in 1888, 1892, and 1900. He is proprietor and editor of a weekly paper, the 'Labour Leader.'

Hardie, **Robert Gordon**, American portrait painter: b. Brattleboro, Vt., 29 March 1854; d. Brattleboro, Vt., 9 Jan. 1904. He studied drawing at the Cooper Union Institute, the Academy of Design, and the Art Students' League, N. Y., and at Paris became a pupil of Gérôme. He exhibited at the Salon in 1880 and following years, and in 1882 studied under Cabanel. A picture of his appeared at the Exhibition of the National Academy of Design in 1888, and he exhibited a portrait of his wife at the World's Columbian Exposition in 1893.

Harding, **Chester**, American portrait painter: b. Conway, Mass., 1 Sept. 1792; d. Boston 1 April 1866. As an artist he was self-taught, his trade being that of a turner. He fought as a soldier in the War of 1812, and found employment on his discharge as a sign-painter in Pittsburg, Pa. Crossing the ocean he became a favorite portrait painter in London and found

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patronage among the royal family. His 'Portrait of Daniel Webster' is owned by the New York Bar Association, while his 'Portrait of John Randolph' is in the Corcoran Gallery, Washington.

Harding, Karl Ludwig. German astronomer: b. Lauenburg 29 Sept. 1765; d. Göttingen 31 Aug. 1834. Called to be a tutor to the son of the illustrious Schröter, he became inspector and observer in Schröter's observatory. In 1805 he was appointed professor of astronomy in the University of Göttingen, and remained in this position till his death. He discovered the asteroid Juno, the third of the planetoids, in 1804, and independently, the second comet of 1813 credited to Pons. His 'Atlas Novus Cœlestis' (1808-23; new ed. 1856) was for years the best of its sort.

Hardness, Scale of. In mineralogy, the hardness of a mineral is estimated by observing which of certain standard minerals will scratch a smooth surface of the given mineral, and which will not. 'On Mohs' scale (which is usually adopted), ten such standard minerals are selected for the establishment of the scale, their hardness being arbitrarily defined as 1, 2, 3, etc., up to 10. The minerals that are commonly used for this purpose are as follows:

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| 1. Talc. | 6. Feldspar. |
| 2. Gypsum. | 7. Quartz. |
| 3. Calcite. | 8. Topaz. |
| 4. Fluorite. | 9. Sapphire. |
| 5. Apatite. | 10. Diamond. |

A mineral which will neither scratch apatite nor be scratched by it, for example, has a hardness of precisely 5; and the same may be said of one which will both scratch apatite and be scratched by it. A mineral which feldspar will scratch but apatite will not, has a hardness intermediate between 5 and 6. The decimal expressing the precise degree of hardness in such a case must be assigned by guess; but there is little use in attempting to determine a hardness more closely than to the nearest half-degree on the scale given above.

Hardware in America during the past century. The term "hardware," like everything else in our country, has suffered a great deal of expansion during the past hundred years, particularly as regards its application. Originally restricted to necessary articles of steel and iron, it has come to embrace in its technical and business understanding a great variety of goods which have no relation at all to the original meaning of the word.

One of the potent causes of this sweeping change has been the steady reduction in the price of hardware for a long series of years. This reduction has not been altogether continuous, but with occasional up-lifts during prosperous times or due to manipulation and control of the products—but on the average the trend has been steadily downward, particularly as compared with a period of 50 years ago. There are innumerable articles whose present cost is only from one third to one half as much now as then. It became necessary for all who were interested in hardware—manufacturers, jobbers, and retailers—to consequently largely increase the volume of their business in dollars and cents, since the mere tonnage output was so much less in value, thus recognizing one of the

elementary principles of business—that the larger the output, within certain limits, necessarily the smaller the average cost of doing business.

Because of the discovery and exploitation of enormous ore bodies of iron, copper, and lead, among which may be instanced the great mines of Lake Superior—both iron and copper—the copper deposits in Montana and Arizona, and the lead and zinc ores in Missouri and the Southwest, and also because of the steady multiplication and increased efficiency of machinery, it became possible to produce the finished product at a steadily decreasing cost.

Experience soon showed that the field of legitimate hardware was not itself sufficiently comprehensive to enable the jobber and the retailer to transact a large enough volume of business commensurate with the cost of doing this; therefore, kindred fields were invaded and occupied, and have now become practically incorporated as part of the hardware business. Thus it has been that the great number of articles which are known as house-furnishing goods, and embrace such lines as refrigerators, ice cream freezers, and innumerable other items which go to make up the objects needed in every household—and that the line of tinware and sheet iron, and what also have come to be known as sporting goods—not only guns, rifles, and pistols, but athletic supplies—have become part and parcel of the hardware business in addition to the line of cutlery, and quite a number of other items in lines that were once entirely separate in themselves and had no relation to the hardware business. Thus the hardware retail dealer has practically reverted to the original type, in the sense of going back to the plan of the old general store and keeping pretty much all that his customers need outside of such lines as drygoods, groceries, and drugs.

Hardware is, to a large extent, naturally the business of a new country because of the great amount of building and the clearing of land, though it is equally true that in the modern civilized, progressive communities of this country the use of hardware is in equal proportion to the demand caused by new countries, and much more complex and complicated in its nature.

The history of hardware is naturally the history of this country, and it can be safely said that there is no other department of mercantile business that has so kept pace with the progress of the United States, nor which to-day depicts so thoroughly all the characteristics of modern American character in all its varied details. Beginning in the crudest way with the manufacture of hand-made implements, and depending almost entirely upon importation from the Old World for what was needed—even in the way of necessities of life—it has grown by giant strides, more especially since the end of the Civil War, and in many instances largely because of the protection afforded by the tariff, until to-day American hardware is practically independent of the foreigner, save in those rare instances where we have not as yet learned the mysteries of manufacture or succeeded in procuring sufficiently skilled workmen to answer the purpose. The manufacturers of hardware in America have been original in their ideas and methods and have adapted themselves absolutely to the necessities of their environments,

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not slavishly following the copies of Old World tools, but being guided solely by common sense and necessity. It has followed thus, particularly in edge tools, that there has been such advancement in the way of appropriateness to purposes intended and improvement in appearance, finish, and design as can be scarcely equalled in any other line of business. The artistic sense has not been lost sight of, but has been appealed to as well as the sense of utility. Cutting tools are made just heavy enough and to avoid the clumsiness of the Old World items in this regard. Originality has been shown in the incessant improvement of existing models and the devising of entirely new conceptions. The manufacturer has not been content to follow the custom of ages—has had little respect for tradition or inheritance, but has set himself solely to the task of producing an effective tool at the lowest possible cost.

It is true that in no country in the world does merit in hardware command the price and popularity as in the United States, and the history of manufacturers who have been successful has been the history of merit, and not because of cheapness in quality or price. The only manufacturers who have been successful for any length of time have been those who have based their products primarily on quality and who have had the faith and courage to maintain this quality in the face, often, of discouraging circumstances. It may be stated as an axiom that no hardware item of the day survives for any length of time on any other basis. The temptation to deteriorate the quality after the reputation is established and built upon its quality has always met with sure and permanent disaster.

The blacksmith of the smaller town and of the country was among the earliest makers of tools and implements, and even to this day in many localities there still survives a call for his hand-made products. The hardest fight which the manufacturers of machine-made articles have had to face has been to overcome the feeling, and often prejudice, in favor of the tool that was made by hand and that seemed consequently superior—and, as a matter of fact, the reverse has usually been the case.

Appearance counts for much—probably more in America than in any other country; attractive packages, handsome labels, and beautiful finishes are as much a part of hardware to-day as the adaptability and merit of an article. There have been numerous strides in this regard, particularly when one contemplates the old-fashioned method of tying up the hardware in heavy paper with string, a package that was both clumsy and unsightly. The question of the size and nature of the package is one of great moment in the appeal to the public, and the general tendency has been to pack the goods in smaller and smaller boxes all the time, to insure their ready sale and prevent breaking the packages, which is always so detrimental to the goods themselves, and so expensive to the dealer.

The importation of hardware is almost at an end, being confined, as before stated, to some few specialties which are slowly but surely losing their hold upon the public of this country; but, on the other hand, the exportation of American hardware—and particularly American edge tools—to all parts of the world is a large and growing business, and one of great

value to the home manufacturer. The foreign business has been obtained entirely by the merit of the American article; its attractiveness, its novelty, its merit, and its adaptability to the purpose intended have, after much opposition, opened the way for American hardware in all parts of the world, so that it has steadily gained ground at the expense of the foreign article.

The steady substitution of machinery for hand labor has been the most potent cause of the great success that hardware has made in the United States. The American manufacturer is never content with present conditions, but is always endeavoring to find a more efficient and more economical method of producing the finished article, and consequently endeavors to substitute machinery for hand labor. American hardware has, therefore, been placed within the reach of all, and has largely contributed to the comfort and welfare of the people.

The production and the use of hardware cannot be intelligently considered without reference to some of the leading conditions of the country—conditions of soil and climate, as well as the temperament and nature of the people. The most far-reaching and enduring change has been the substitution of what is known as mild steel for wrought iron, due to the invention of Sir Henry Bessemer. It has rendered possible the production of hardware in all brands at very much lower prices and much more numerous forms since the production of open hearth and of Bessemer steel, which thus supplanted those of cast iron and of wrought iron.

On the other hand, hardware has been very adversely affected by this change because of the consequent substitution of steel for wood, and this is most marked in the erection of the modern sky-scraper, as it is known, where there is but comparatively little hardware used, either in the erection of the building or in its subsequent finishing. These buildings having practically little or no wood in them have small use for either the carpenter or his various tools, and all that is left of hardware is a small amount of locks and trim to decorate the building and to give it security. This process has gone on in many ways until apparently it must seriously affect the continued use of hardware in all branches of life; but, on the other hand, the growth of the population has been so great that this can be safely set down as a discussion of only academic interest at present.

In a country so diversified as to soil and climate, there is a necessity of great diversity of hardware, and the goods used in the different parts of the country invariably reflect the nature and temper of the people. The South is much more conservative than the North and clings longer to old-fashioned articles of well-known reputation some time after they have been superseded in the North by more modern things. Because of the comparative poverty of the South in the past, and the fact that the negro is the principal laborer, the demand, until lately, has been rather for price than for quality. Again, in the extreme East very much the same conditions prevail, owing to the natural economy of the people and their extreme conservatism. The West—by which is also meant the Southwest and the Northwest—is a great consumer of hardware, and within its bounds are the great distributing hardware centres.

The steady and rapid destruction of the

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forests has had a far-reaching effect upon the hardware business, and one that is destined to, in many cases, permanently alter the use and nature of many hardware implements. In the beginning the country had to be cleared of forests, which created an enormous demand for all edge tools and stimulated the ingenuity of the manufacturers to produce articles fitted for the different needs—not alone for the different sections of the country, but also for the various kinds of wood. Now that the white pine forests have practically been destroyed, it is necessary to have edge tools that are more and more adapted for use of the hard woods which are still fairly abundant; and the question also presents itself to the manufacturers as to how long it will be possible to keep up the present production of such items as axes and cross-cut saws, in view of the fact that the forests are steadily disappearing.

It is impossible within the limit of this article to more than briefly mention some of the leading branches of the hardware business and tell in a few words of their nature and history.

Wire Industry.—One of the most prominent to-day is that of the wire industry, because it ramifies and affects almost every part of the hardware business. It early felt the impetus of the advantages offered by the Bessemer steel process, since it was possible to produce in wire made from steel many items which could not be drawn from wrought iron. It is difficult to state with exactness—because of its largely conflicting with other branches of iron and steel manufacture—but it has probably invested in its manufacture more than \$200,000,000, and its output in 1905 was something like 15,000,000 tons. Few things have been of greater interest than the story of barbed wire and its enormous growth since its introduction. It is probably the cheapest fencing ever placed upon the market, and exactly met the demands of the new country where thousands of acres had to be fenced in at a time. It is still a product of great tonnage, but its place is being slowly but surely taken by the woven-wire fencing which, though higher in price, is more effective and is better suited now for the country, which is gradually being cut up into smaller farms.

Nail Industry.—The nail industry is a conspicuous example of the chance and changes in manufacture, for in the beginning the iron cut nail, first as made by hand and afterward by machinery, had behind it the prestige of centuries, and seemed to be enduring as an article of every-day use. It was found, however, that with the growth of the Bessemer steel business, the steel cut nail could be made cheaper, although it was not in any way a better article. Its place, in turn, is being very fastly taken by the wire nail, which is much more comprehensive in its uses than the steel cut nail, though the latter style prevails in certain sections and for certain purposes, but the decline of the steel cut nail is as marked in its way as the rapid increase in the use of the wire nail.

Tacks.—The kindred industry is that of tacks, but it has been seriously hurt by the expansion of the wire nail since it is possible to make the latter in many forms and sizes that are substitutes for tacks. This industry was founded in Taunton about 75 years ago, and for a great number of years was practically confined to New England. It spread gradually westward to Pittsburg; there it almost died out,

and has since taken some hold further west in Cleveland and Chicago. Owing to the encroachment of the wire nail it has declined rather than advanced, and the number of manufacturers has been greatly decreased. The product is not large—probably not more than 15,000 tons per annum.

Farming Tools.—The making of farming tools and what are known technically as "steel goods" is one of the most important industries in the hardware line, since with these tools the crops are cultivated and gathered. The steady progress of the American manufacturer has been in the direction of producing items which were light, strong, and handsome in appearance. The diversity of soil and climate mean great diversities of various items used in cultivating the ground, and the number grows each year. The business does not keep pace with the growth of the country owing to the steady increasing use of labor-saving machinery—the mower and the reaper have taken the place of the snath, the cradle, and the scythe—the corn binder of the corn knife, and the corn planter and the cultivator have gradually diminished the use of hoes. The amount of capital invested is not exactly known, but does not probably exceed \$3,000,000. The absolute importance of these tools to the country is rather striking contrasted with the small annual output in dollars and cents. See AMERICAN FARM IMPLEMENTS.

Builders' Hardware.—The builders' hardware business is often considered the centre of the hardware trade, because of its great importance as related to the hardware industry as a whole. Builders' hardware is an exceedingly comprehensive term and does not admit of exact definition. It is ordinarily used in reference to locks (see LOCKS) and trim and to all the various items which find employment in the building of a house. It is a business of immense complexity and has a most interesting history. It began far back in New Haven and New Britain, Conn., as early as 1834, and the first goods were naturally crude and rough. Shortly, however, the ingenuity of the American manufacturer produced a new article in the shape of the cast-iron lock, thus departing entirely from the wrought lock, which was formerly known to England, Germany, and France. The cheapness of the cast-iron lock and its actual efficiency soon caused it to entirely displace the foreign article. Since that time the sheet steel lock has been made in this country, but in a much smaller and more condensed form than the wrought lock of Europe.

Builders' hardware has a most interesting history since it is in part the story of the development of taste in America. The Centennial Exposition of 1876 did much to educate the people of this country in the way of good taste and high artistic ideals. There gradually became a demand for things of daily use which should have beauty as well as utility, and particularly of late years this feeling has spread to locks and trim, and all forms of builders' hardware, with increasing emphasis. The leading manufacturers have innumerable designs which are suitable for the different schools of architecture, such as Gothic, Renaissance, and Colonial, or any of the variations of the standard schools. All high-grade builders' hardware is now gotten up in shape and design to match appropriately not alone the building, but each separate room where the rooms are finished and

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ornamented differently. It is, therefore, largely a thing of ornament as well as of use, and the ingenuity of the manufacturer and the salesman has been taxed to keep pace with the demands of the consumer for novelty and appropriateness. It is difficult to more than approximate the annual production, but it is probably something like a matter of \$25,000,000 in value. The finest grades of hardware are still made largely in the East, principally in Connecticut, but the business is slowly but steadily drifting west in keeping with the general trend of hardware manufacture.

Shovels.—The first shovels in this country were produced as far back as 1776 by Captain John Ames, who made them by hand in competition with the English article. The business then established was carried on there for the succeeding 27 years, and constituted the nucleus of the present large concern of the Oliver Ames & Sons corporation, whose headquarters are in Northeaston, Mass. Mr. Oliver Ames, the son of Captain John Ames, established in 1803 a shovel plant where he soon produced shovels that were superior to those imported from England. In 1797 Thomas Rowland commenced the manufacture of shovels at Cheltenham, Pa., and this plant has been in continuous operation ever since. Business gradually crept westward and is now spread over the country as far west as the Mississippi river. By 1854 there was something like 80,000 dozen shovels produced annually, but with the growth of the country this product has been largely increased until the annual output is now about 600,000 dozen. As with all other hand tools, the demand for shovels has been seriously affected by the introduction and improvement of labor-saving machinery—such as the steam shovel, the coal and ore conveyor, and other mechanical devices for loading and unloading. It is interesting to note that the original machinery for making shovels has not been greatly improved upon so far as the actual efficiency is concerned, although the variety of shovels has been greatly increased to meet the wants and tastes of the different parts of the country. It is difficult to approximate with any reasonable degree of accuracy the amount invested in this business, but it is probably in the neighborhood of \$7,000,000.

Saws.—There are few things more difficult to make than saws, and they have been the subject of study of some of the most talented and ingenious manufacturers of the country. They were manufactured as far back as 1806 in Philadelphia, though in a very small way. In 1820 a factory was established in Bristol, Conn., by Irenus and Rollin Atkins, Rollin Atkins being the father of E. C. Atkins, the founder of E. C. Atkins & Company, of Indianapolis, who now have one of the largest saw plants of the world. It was necessary to import the first saw makers from England.

In 1840 Henry Disston, an Englishman by birth, really made the great beginning of the saw-making industry in Philadelphia, and soon produced saws that had no equal in the world. It was only a short time before the Disston saws drove out the English brand entirely from this country, and to-day this firm have not only achieved a world-wide reputation for merit but send their products all over the globe. The annual output of all saws amounts to between \$10,000,000 and \$12,000,000, and there is about

that amount of capital invested in the business. The tonnage of steel used in the manufacture of saws varies from 15,000 to 20,000 tons per annum.

American saws, particularly hand saws, are pre-eminent in America and have no equal abroad. Outside of the Disston factory there are several very large and prominent makers, among them E. C. Atkins & Company, of Indianapolis, Ind., and the Simonds Manufacturing Company, who make their headquarters at Fitchburg, Mass. The saw business has been notable because of the genius shown by the manufacturers, and in this respect Henry Disston is pre-eminent. There are probably something like between 5,000 and 6,000 people employed permanently in the business. See **SAWS AND SAWING.**

Axes.—Axes have always been among the most important items in the hardware business because of the great need of them in felling the forests with which the country was covered in the early days. They are of innumerable sizes and shapes to suit the needs of the lumbermen and the users. The production has not increased of late years, due not only to the deforestation of the country, but also to the fact that the place of axes is being largely taken by cross-cut saws. The annual output is somewhere between 350,000 and 400,000 dozen. As in other lines of business, there have been great consolidations, so that a few large concerns have taken the place of innumerable small ones. The use of natural gas has had a most important effect on the manufacture of axes, since with it a very much superior tool can be made, and it is also of great advantage in tempering. It is noticed as regarding the matter of tempering—a thing of vital necessity in all edge tools—that practically there has been no improvement in this regard for several centuries. Not alone did many of the implements of the ancients equal in temper the best that can be produced now-a-days, but in many cases they were much superior. The difficulty seems to lie in the fact that tempering is purely a thing of experiment and not of scientific development, the reason for it not being known, nor why some metals can be tempered and others cannot. In the beginning axes were originally made by hand as were all the other hardware implements, but later the tendency developed to establish small factories on available water powers throughout the country, as at Pittsburg, Pa., Lewistown, Pa., East Douglas, Mass., and Collinsville, Conn. With the enormous demand for the goods, this industry soon outgrew its "leading strings" and established itself at more available locations.

Edge Tools.—The item of edge tools is a very large one, and next to builders' hardware, probably the most important in the whole range of hardware proper. It embraces practically everything with a cutting edge such as hatchets, chisels, drawing knives, planes, and the like, and space forbids any attempt at more than generalities. It is interesting to note that on such small items as chisels, drawing knives, adzes, and hatchets, the advance within a period of 1,000 years has been rather of attractiveness of form and appearance than in actual adaptability or merit. Some tools dug up from the Roman camp of Salzburg are, so far as adaptability goes, quite equal to any that are made up now-a-days. The simplicity of the articles mentioned

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has largely rendered their impossible of any great improvement. In the more complicated lines such as planes and the like there have been very great changes and improvements, and the plane industry, particularly, is one of enormous proportions. The manufacturers who have attained a reputation in edge tools have done so purely on the score of merit and because of the fact that each manufacturer made only one particular line, no one thus having a complete line of edge tools of uniform excellence, design, and efficiency; and one of the great causes of the demand for American hardware abroad—particularly since the Spanish War—has been the fact of the assembling of a complete line of high grade tools under one brand, so that the foreigner realized that anything that bore that particular trade-mark could be depended upon as being uniform in quality and efficiency. Among the somewhat lesser items in the tool line have been the interesting developments in auger bits of innumerable designs and patterns, with varying adaptability for different kinds of work. See TOOLS.

Files.—There are few things of greater and more growing importance to the hardware dealer than that of files, and it is an interesting story of development and of the genius of the manufacturer. They are articles which have to be made with the greatest care and go through a great number of processes before they reach perfection and are fitted for use. The five leading operations requisite are forging, annealing, grinding, cutting, and hardening. They were formerly made entirely by hand, and even to this day, there still exists among a few, the preference for the hand-made file. The history of the business really dates from the practical use of a machine to cut files, patent for which to all intents and purposes was first issued to William Nicholson in 1816. There are records of file-cutting machines in France as far back as 1699, and several since that time up to the 19th century, but none of them apparently of any practical value. The first really important attempt to manufacture files was soon after 1850 at Ramapo, N. Y., a company being organized under the name of the American File Company, with large capital. The life of the attempt was short, however, and the business was soon discontinued. Various attempts were made shortly after that—both in this country and England—to manufacture files by machinery, and none of them had any extended experience.

About 1863, Mr. William T. Nicholson, of Providence, R. I., gave the matter of file cutting by machinery his personal thought and attention. He had long training as a mechanic and practical experience in the finest branches of machinery. At that time the great source of supply of files for this country were the hand-made files of England, and the story of attempts to cut files by machinery had been one of sunken capital, ruined hopes, and dismal failures. From this beginning grew the great present firm of the Nicholson File Company, which largely dominates the file trade in this country and has an enormous export business. They have produced better and cheaper files than it is possible to cut by hand, and have carried the business apparently to the point of perfection. The importation of files has fallen to about \$75,000 per annum, while the total output of American files does not fall short of \$6,000,000, and is repre-

sented by total investments of approximately \$12,000,000. See FILES AND FILEMAKING.

Rasps.—Few things have been more marked than the determination of the American manufacturer to successfully produce a machine-cut horse rasp. It followed a long way in the wake of the machine-cut file, and after many discouragements—the principal difficulty being to overcome the inveterate prejudice of the blacksmith. To-day hand-cut horse rasps are a thing of the past.

Bolts and Nuts.—The manufacture of bolts and nuts dates as far back as 1708, a patent for screw machinery at that time being issued to David Wilkinson, a celebrated mechanic of Rhode Island. There were various other patents granted and these gradually developed in later years into the present slotters, threaders, pointers, and tapers. By slow growth and by innumerable inventions and improvements this industry has attained its present enormous proportions and is represented to-day by about 15 prominent makers, who manufacture all of the various kinds and styles of bolts, the yearly product being something like 1,000,000,000 bolts.

Screws.—The manufacture of screws—or, as they are technically known, wood screws—is one of the important developments of this country, though the demand does not keep pace with the growth of the country owing to the continued substitution of steel for iron, and consequently of bolts and rivets for screws. Screw machinery is of the highest type of automatic efficiency and almost equals human intelligence in its working. Patents for various devices on screw machinery date back into the latter part of the 18th century, and innumerable patents have been issued since that time. The real beginning of successful manufacture was in 1838 when the Eagle Screw Company was incorporated in Providence, R. I., the leading spirit being Mr. William G. Angel. In 1846 Mr. Angel finally perfected the machine for making what is known as the gimlet point or a screw—up to that time it had a blunt point. From this time dates the prosperity and growth of his company, which grew into the present American Screw Company. There are now some 13 large concerns engaged in the manufacture of screws and scattered from New England to the Mississippi river. See SCREWS.

Tin Plate.—The tin plate and sheet iron industry has kept pace with the general growth of the iron industry all over the country, and has been greatly fostered by a protective tariff since the time of what has been known as the McKinley Bill. Its production in this country has grown at an enormous rate, as may be seen by the statement that in 1892 there were only about 18,000 tons of tin plate produced in this country as against about 458,000 tons in 1904. The industry is chiefly represented by what are known as black sheets, galvanized iron, and tin plates—all of which have now become integral parts of the hardware business. See TIN PLATE.

Tinware.—Among the lines which were originally independent, but which have practically become now incorporated with the hardware business, is that of the tinware industry in all its various ramifications. The retail hardware shop has practically absorbed the tinner's shop and because of the fact that hand-made tinware is fast being supplanted by the product of the stamping company, the hardware retailer has

gone into the handling of tinware in all shapes and varieties.

Enameled Ware.—Coincident with this is the development of what is known as enameled ware, being a coating on the sheet steel in place of the tinning. It is of all colors and varieties and has grown to be a business of great importance. It illustrates distinctly the general desire of the people for something more tasteful and artistic in appearance than the old-fashioned tinware.

Mechanics' Tools.—The American manufacturer has shown to great advantage in the manufacture of high grade mechanics' tools for exceedingly fine measurements. In this respect the Brown & Sharpe Manufacturing Company, of Providence, R. I., occupy a commanding position and their products to-day are sought for all over the world where exceeding accuracy is necessary. As an example, the micrometer caliper will measure with absolute accuracy the 250,000th part of an inch. For an attainment of such results, the finest tools made by any other nation cannot be compared with those of America.

Cutlery.—Few things are more interesting than the history of cutlery-making in the United States, as it has suffered many "ups and downs," not alone from various foreign competition, but from the difficulty of procuring sufficiently skilled labor to produce the proper article. The manufacture of scissors and shears—which are always treated as a part of the cutlery business—has been unique in the fact that it was a Yankee genius who first solved the problem of welding a high grade steel blade to a soft casting of iron backing made to fit the hand, this being the invention of Seth Boyden in 1826. The actual manufacture of shears in this country seems to have been commenced by R. Heinisch in 1825 at Elizabethport, N. J. This was followed by others until at present the American shears have been developed and improved as to be far ahead of any in the world. Prior to 1832 table cutlery was imported very largely from England. From that year American manufacturers began in a small way to produce these goods, and by 1865 they had practically taken the business unto themselves. There is a large export trade business in table cutlery owing to the superior quality of the goods made in this country.

The making of pocket cutlery is one of the most interesting things connected with the hardware business in America. It was started at Lakeville, Conn., by the Holley Manufacturing Company about 1845. The total annual capacity was probably less than \$50,000. The business was gradually extended in a small way and finally a co-operative colony was established at Walden, N. Y., and since then this line of American industry has largely centred in the two States of New York and Connecticut. Innumerable factories have been started and have failed, largely owing to the lack of foresight on the part of the manufacturers in attempting to compete with the cheap labor of Europe in producing goods both cheap in quality and finish as they were in price. The co-operative colony spoken of grew by slow degrees and economical management, having the advantage of large water power at Walden, until they finally became one of the leading makers, not alone of

this country but of the world, and were enabled to show at the recent Louisiana Purchase Exposition products superior to those made abroad, for which they received the highest award. It is an interesting case of development in the way of quality and of merit by patience and skill. There are something like 10 or 12 makers now in the field and their annual product is roughly set in the neighborhood of \$2,000,000.

E. C. SIMMONS.

Hardy, Arthur Sherburne, American novelist: b. Andover, Mass., 13 Aug. 1847. After a single year at Amherst College he entered the West Point Military Academy, graduating in 1869. He became a second lieutenant in the 3d Artillery regiment, saw some service during 1869 and 1870, and then resigned to become a professor of civil engineering at Iowa College for a brief time. In 1874 he went to Paris to take a course in scientific bridge-building and road-constructing, returning to take a professorship in that line of instruction at the Chandler Scientific School, connected with Dartmouth College. He assumed a similar professorship in Dartmouth College in 1878. This position (in connection with which he published 'Elements of Quaternions' (1881), followed by his translation of 'Argand's Imaginary Quantities,' by his own 'Analytical Geometry'; and 'Elements of the Calculus'; 'Imaginary Quantities'; and 'Methods in Topographical Surveying') he held until 1893, when he became editor of 'The Cosmopolitan Magazine.' He was United States minister to Persia, 1897-9, and envoy extraordinary and minister plenipotentiary to Greece, Rumania and Servia, 1899-1901, to Switzerland, 1901-3, and to Spain since 30 Jan. 1903. His works include: 'But Yet a Woman' (1883); 'The Wind of Destiny' (1886); 'Passe Rose' (1889); 'Songs of Two,' poems (1900); 'His Daughter First' (1903). He also wrote the 'Life and Letters of Joseph Hardy Neesima' (1890).

Hardy, Edward John, English author and clergyman: b. Armagh, Ireland, 7 May 1849. He took orders in the English church, became an army chaplain, in 1903 was stationed at Hong Kong, and in 1905 in Egypt. He is known the world over as the author of 'How to be Happy though Married' (1884), which has been translated into many languages. Other work by him are: 'Manners Makyth Man' (1885); 'Faint yet Pursuing' (1886); 'Uncle John's Talks with his Nephews' (1886); 'The Five Talents of Women' (1888); 'The Love Affairs of Some Famous Men' (1897); 'Mr. Thomas Atkins' (1900); 'Concerning Marriage' (1901); 'Love, Courtship and Marriage' (1902); 'Pen Portraits of our Soldiers' (1902); 'Love Rules the World' (1905); 'John Chinaman at Home' (1905).

Hardy, Iza Duffus, English novelist, daughter of Sir Thomas Hardy, the English historian. Among her numerous novels are: 'Glencairn' (1877); 'Only a Love Story' (1877); 'A Broken Faith' (1878); 'The Love that He Passed By' (1884), an American novel; 'A Woman's Loyalty' (1893); 'The Lesser Evil'; 'Man, Woman, and Fate'; 'A Butterfly' (1903), etc., and two volumes of transatlantic reminiscences, 'Between Two Oceans' (1884), and 'Oranges and Alligators: Sketches of South Florida Life' (1886).

HARDY — HAREM

Hardy, Thomas, English novelist: b. Dorsetshire, England, 2 June 1840. He was educated as an architect and practiced his profession 1862-73. He then turned to literature and is now recognized as the first of living English novelists. His published works include 'Desperate Remedies' (1871); 'Under the Greenwood Tree' (1872); 'A Pair of Blue Eyes' (1873); 'Far from the Madding Crowd,' which first established his fame (1874); 'The Hand of Ethelberta' (1876); 'The Return of the Native' (1878); 'The Trumpet-major' (1880); 'A Laodicean' (1881); 'Two on a Tower' (1882); 'The Mayor of Casterbridge' (1886); 'The Woodlanders' (1887); 'Wessex Tales' (1888); 'A Group of Noble Dames' (1891); 'Tess of the D'Urbervilles' (1891); 'The Three Wayfarers' (1893); 'Life's Little Ironies' (1894); 'Jude the Obscure' (1895); 'Wessex Poems' (1898); 'Poems of the Past and Present' (1901). Consult: Johnson, 'The Art of Thomas Hardy' (1894); Macdonnell, 'Thomas Hardy' (1894); Windle, 'The Wessex of Thomas Hardy' (1901); Sherren, 'The Wessex of Romance' (1902); 'The Dynarts,' pt. I., vol. IX (1904).

Hare, Augustus John Cuthbert, English descriptive writer: b. Rome, Italy, 13 March 1834; d. St. Leonards 22 Jan. 1903. His life was spent mainly in travel, on descriptions of which his fame chiefly rests. Among his many works may be cited 'A Winter at Mentone' (1861); 'Walks in Rome' (1870); 'Wanderings in Spain' (1872); 'Memorials of a Quiet Life' (1872); 'Days near Rome' (1874); 'Walks in London' (1877); 'Days near Paris' (1887); 'Sussex'; 'The Story of My Life' (1895).

Hare, John, English actor: b. London 16 May 1844. He made his first appearance in Liverpool, then going to London played at the Prince of Wales theatre, and later was manager of the Court theatre, the Garrick theatre, and the Globe theatre. He became distinguished as a comedian, and visited the United States, playing in the chief cities. The plays he has brought out include 'A Scrap of Paper'; 'Still Waters Run Deep'; 'A Bachelor's Romance'; and 'Gay Lord Quex.'

Hare, John Innes Clarke, American jurist: b. Philadelphia 17 Oct. 1817. Graduated from the University of Pennsylvania in 1834, he was admitted to the bar in 1841, was successively associate and presiding judge of the Philadelphia district court (1851-75), and in 1875-95 presiding judge of the court of common pleas. He was also for a time professor of the institutes of law in the University of Pennsylvania, and published: 'American Leading Cases' (1847; with Wallis); 'The Law of Contracts' (1887); 'American Constitutional Law' (1889), eleven volumes of chancery reports, and other works.

Hare, Robert, American scientist: b. Philadelphia 17 Jan. 1781; d. there 15 May 1858. He was professor of chemistry in the University of Pennsylvania 1818-47. He will be longest remembered for his discovery of the oxyhydrogen blowpipe to which he gave the name 'hydrostatic blowpipe,' but he also invented the valve-cock, the calorimeter and a process for denarcologizing laudanum. He wrote 'Brief View of the Resources of the United States' (1810); 'Chemical Apparatus and Manipulations'

(1836); 'Memoir on the Explosiveness of Nitre'; etc.

Hare, William Hobart, American Protestant Episcopal bishop: b. Princeton, N. J., 17 May 1838; d. 25 Oct. 1909. He studied at the University of Pennsylvania, was ordained priest in 1862, was minister of St. Luke's, St. Paul's (Chestnut Hill) and other churches of Philadelphia, and in 1873 was consecrated missionary bishop of Niobrara. In 1883 his diocese, having been enlarged so that its limits were identical with those of the territory of South Dakota, was renamed that of South Dakota. He became known as an authority on the Indian question, and wrote pamphlets on mission work in the western United States.

Harebell, or **Bluebell**, a familiar species of bell-wort (*Campanula rotundifolia*), common throughout the northern parts of the whole northern hemisphere (see BLUEBELL; CAMPANULA), growing in dry and hilly pastures, on waysides, and open lands generally. It is, however, rare in America south of Canada, although other species are to be found here. It is perennial, with a slender stem 6 to 14 inches high, bearing a loose raceme of a few drooping flowers, on very slender stalks; the flowers, generally bright blue, but sometimes white, bell-shaped, and about half an inch long, appear in summer and autumn. The juice of the flowers yields a fine blue color, and may be used as ink.

Harel, Paul, p^ôl à-rêl, French innkeeper-poet: b. Echauffour (Orne) 1854. He became landlord of the "Croix Saint-André," an inn at Echauffour, and within a modest range of subject wrote picturesque verses in an excellent lyric style. He was elected to the Caen Academy, and on the recommendation of Sully-Prudhomme received a prize from the Académie Française. Among his works are: 'Sous les Pommiers' (1879); 'Rimes de Broche et d'Epée' (1883); 'Aux Champs' (1886); and 'L'Herbager,' a three-act poetic drama (1891).

Harelip. A deformity of the upper lip, due to some prenatal influences, causing it to divide vertically on either or both sides of the middle line. Sometimes a cleft palate accompanies harelip. The affliction is susceptible to treatment, but a slight operation, a few months after birth, is commonly necessary. The palate, however, should not be operated upon before the age of four or five. Treatment of the cleft palate, when present, may be given simultaneously with that of the lip deformity.

Ha'rem, or **Hareem** (Ar. 'the prohibited'), is used by Mussulmans to signify the women's apartments in a household establishment, forbidden to every man except the husband and near relations. The women of the harem may consist simply of a wife and her attendants, or there may be several wives and an indefinite number of concubines or female slaves, with black eunuchs, etc. The greatest harem is that of the sultan of Turkey. The women of the imperial harem are all slaves, generally Circassians or Georgians. Their life is spent in bathing, dressing, walking in the gardens, witnessing the voluptuous dances performed by their slaves, etc. The women of other Turks enjoy the society of their friends at the baths or in each other's houses, and appear in public accompanied by slaves and eunuchs; but the women of the sultan's harem have none of these privileges.

HARES — HARGREAVES

It is of course only the richer Moslems who can maintain harems; the poorer classes have generally but one wife.

Hares. In the United States the names hare and rabbit are used indiscriminately for various species of rodents of the family *Leporidae*. Hare is the generic term, while rabbit is applied properly to a single short-legged species of essentially burrowing habits whose naked, blind, and helpless young are nurtured in underground nests (see **RABBIT**). None of the native American species have these characteristics. The second pair of upper incisors are small, non-functional and placed directly behind the large gnawing teeth, a peculiarity which distinguishes the hares and a few allied forms from all other rodents. The ears are always large, the tail short, bushy, and upturned, the forelimbs short and five-toed, the hind ones long and four-toed, and the soles of the feet densely hairy. Hares are exclusively vegetarian. They are extremely timid, alert and have keen senses. They move with peculiar erratic leaps and with great speed for short distances, and walk with a peculiar shuffling gait by placing the entire sole of the hind foot on the ground. A favorite attitude is that of resting on the haunches with the head erect; but the forelimbs lack altogether the prehensile powers of the squirrels. None of them are arboreal or aquatic. The older catalogues enumerate from 20 to 30 species from all parts of the world except Australasia, but chiefly belonging to the northern hemisphere. With a very few exceptions all the hares are included in the single genus *Lepus*.

The gray rabbit, wood rabbit or cottontail (*L. floridanus* or *L. sylvaticus*) is very plentiful throughout eastern North America north to Ontario. It frequents thickets and brier patches on the borders of woods, multiplying excessively in the more thickly settled regions and replacing the more retiring varying hare. All kinds of succulent herbage, bark, berries, and buds, the latter especially in winter, form the rabbit's food, which it seeks to a large extent along regularly established runways, not infrequently leading to the farmer's truck-patch. Although it does not itself burrow, the cottontail frequently escapes its pursuers by retreating into the holes of woodchucks, skunks, etc., in this respect and some others resembling the true European rabbit more closely than any other American species. Several broods of four to six young are raised each year. At birth they are blind and helpless, and are protected in a nest built in a depression in the ground of dried grass or weeds lined with the rabbit's own fur.

The varying hare or white rabbit (*L. americanus*) is a larger species with longer hind legs, taking its name from the alternating brown and white color of summer and winter respectively, a change which is less complete southward. Much difference of opinion has prevailed regarding the manner in which this change occurs, the latest competent view being that the white coat is due to the growth of new white-tipped hairs among the soft short fur, the brown tint of which again appears with the loss of the white ends of the hairs in the spring. In one or other of its varieties it ranges from Virginia northward to Hudson Bay, and is common in the hemlock forests northward. This is a typical hare, which depends for its safety from foxes, lynxes, wea-

sels, hawks, owls and numerous other enemies solely upon its quick senses and great speed. It never enters burrows, but lives by day and night with no other shelter than that afforded by thickets. Feeding chiefly by night it travels along regular runways used in common by several individuals, a fact which is sometimes taken advantage of by foxes and other enemies to compass their destruction. A favorite winter food is the bark and buds of the birch tree. Scarcely any nest is formed for the young, which are fully active a short time after birth. A somewhat similar species is the polar hare (*L. arcticus*), a pure white species of high northern latitudes.

The jack-rabbit or prairie hare (*L. campestris*) is representative of a group of large, long-legged, big-eared hares which inhabit the western plains, and whose lives are spent mostly "on the jump." For short distances they are perhaps the swiftest quadrupeds known. Their lives are spent among the bushes, upon the twigs of which they feed, and where their young are dropped and within a short time required to shift for themselves. In cultivated districts the jack-rabbits increase enormously and become great pests. As a consequence they are much hunted, not only with dog and gun and snare, as are the eastern species, but by the organization of extensive "drives" which result in the destruction of thousands, the bodies of which are shipped to the markets. Coursing them with greyhounds after the English fashion (see **COURSING**) is an exciting and favorite sport.

The marsh hare (*L. palustris*) and water hare (*L. aquaticus*), of the Southern Atlantic seaboard and the Mississippi valley respectively, are rather short-legged species, which differ from the others in the readiness with which they will enter water.

In Europe the common hare (*L. timidus*), the mountain hare (*L. variabilis*) and the rabbit (*L. cuniculus*), from which the domestic races have been derived, are the principal species. Consult: Coues and Allen, 'Monographs of the Rodentia' (1877); Thompson, 'Wild Animals I have Known' (1898); Stone and Cram, 'American Animals' (1902).

Hargraves, hār'grāvz, Edmund Hammond, English discoverer of the gold-fields of Australia: b. Gosport, England, 1815; d. Sidney, N. S. W., October 1891. When 18 he settled in Australia, but attracted to California in 1849, he there tried his luck as gold-digger, and detecting a similarity in the geological formation of California and Australia, inferred that gold would be found in the latter, also on his return established the correctness of his surmise by finding gold on the west slopes of the Blue Hills in New South Wales in 1851. He was appointed commissioner of crownlands, and received from the government of New South Wales a reward of \$50,000. In 1855 he published 'Australia and Its Gold-fields.'

Hargreaves, hār'grēvz, James, English inventor: b. Stanhill, near Blackburn, Lancashire; d. Nottingham, England, April 1778. In 1760 he invented a machine consisting of a revolving cylinder with cards or combs set round it as a substitute for the hand-cards formerly in use in combing out cotton. Some years after this he invented the spinning-jenny, by which he was able to spin with several spindles at once. With his new machines he succeeded in turning out a

much greater amount of yarn than his neighbors, which excited their jealousy, and they accordingly broke into his dwelling, and destroyed his machine. In consequence of repeated persecution of this kind Hargreaves removed in 1768 to Nottingham, and in 1770 obtained a patent for his invention. Here, however, he reaped scarcely any more benefit from it than before. After refusing £3,000 offered him by a private company for his patent, this was declared invalid on the ground that he had sold several of the machines before taking out the patent. For the rest of his life he carried on business as a cotton manufacturer in partnership with Mr. James. The only public recognition this invention ever obtained was in the form of a bounty of £250 granted by Sir Robert Peel, nearly 70 years after Hargreaves' death, to his last surviving daughter.

Häring, Wilhelm, vîl'hêlm hâ'ring, 'ALEXIS WILIBALD,' German historical novelist: b. Breslau 29 June 1798; d. Arnstadt 16 Dec. 1871. His work was suggested by the 'Waverley Novels' and in fact, his first two important works, 'Walladmor' and 'Avalon Castle,' purported to be translations from Scott. His works are historical tales of Prussia, with Frederick the Great for hero: among these may be cited 'Cabanis'; 'The False Waldemar'; 'Peace is the First Civic Duty.' He was very fertile in plot and incident, but his style is mannered; the tales are still popular, however, from their patriotic fervor.

Harivansa, hâ-rî-vân'shâ, a Sanskrit epic poem, later than the Mahâbhârata, to which it forms a sort of sequel or epilogue. It has been translated into French by Langlois (1834).

Hark, Joseph Maximilian, Moravian clergyman: b. Philadelphia 4 June 1849. Graduated from the Moravian College and Theological Seminary in Bethlehem, Pa., he entered the Moravian ministry and was successively pastor of Moravian churches in Lebanon, Philadelphia and Lancaster, Pa. Since 1893 he has been principal of the Moravian Seminary at Bethlehem, Pa., the oldest girls' boarding school in America. He has been a frequent contributor to 'The Outlook' and other periodicals, and has published 'The Unity of the Truth in Christianity and Evolution.'

Harkness, Albert, American Latinist: b. Menden, Mass., 6 Oct. 1822; d. Providence, R. I., 26 May 1907. He was graduated from Brown University in 1842, and in 1855 was appointed professor of Greek in that institution. He was a founder of the American Philological Association, and its president in 1875-6. In 1884 he was elected director of the American School of Classical Studies at Athens, Greece. His best-known works were a series of Latin text-books widely used and of much influence; including a first book, readers, a manual of prose composition, editions of Cæsar, Cicero, and Sallust, and an excellent 'Latin Grammar' (1881), revised and enlarged as 'A Complete Latin Grammar' (1898).

Harkness, William, American astronomer: b. Ecclefechan, Scotland, 17 Dec. 1837; d. 1903. He was graduated from Rochester University in 1858, studied medicine, was a surgeon in the Federal army for a time, in 1862-5 was an aid in the United States naval observatory, and during the total eclipse of 7 Aug. 1869 discovered the

line K. 1474 of the solar corona. He is best known for his theory of the focal curve of achromatic telescopes, and for his invention of the spherometer caliper, the most nearly accurate device for the measurement of the inequalities of pivots in astronomical instruments. In 1894-9 he was astronomical director of the Naval Observatory, and in 1899 was retired with relative rank of rear-admiral. He published 'The Solar Parallax' (1891).

Harlan, här'lan, James, American legislator: b. Clarke County, Ill., 25 Aug. 1820; d. Mount Pleasant, Iowa, 5 Oct. 1899. He was graduated from Indiana Asbury (now De Pauw) University in 1845, in 1853 was elected president of Iowa Wesleyan University, in 1855-65 served as United States senator, in 1865-6 was secretary of the interior, and then served a third term (1866-72) in the Senate. Subsequently he was editor of the *Washington Chronicle*, and in 1882-5 presiding judge of the court of commissioners of Alabama claims.

Harlan, John Marshall, American jurist: b. Boyle County, Ky., 1 June 1833. He was graduated from Centre College, Kentucky, studied law at Transylvania University, and entering upon the practice of his profession at Frankfort, became county judge in 1858, and was Whig candidate for Congress in 1859, but was not elected. In the Civil War he served in the Union army as colonel of a Kentucky regiment, and in 1863-6 was attorney general of his State. He was Republican nominee for governor in 1871 and 1875, but was defeated on both occasions. In the Republican National Convention of 1872 his name was presented by the Kentucky delegation for the nomination for vice-president of the United States. In 1877 he was appointed a member of the commission to investigate the troubles in Louisiana; and in November of that same year he was appointed associate justice of the United States Supreme Court, of which he is considered one of the most able and independent members. He supported the constitutionality of the income tax clause of the Wilson Tariff Bill.

Harlan, Iowa, city, county-seat of Shelby County; on the West Nishnabotna River, the Chicago, R. I. & P., the Chicago & N. R.R.'s; about 90 miles west of Des Moines. The chief manufactures are foundry products, agricultural implements, flour, bricks, gasoline engines, and furniture. Its shipping trade is in agricultural products and the manufacturers of the city. Pop. (1910) 2,570.

Harland, här'land, Henry, pseudonym 'SIDNEY LUSKA,' Anglo-American novelist: b. St. Petersburg, Russia, 1 March 1861; d. San Remo, Italy, 21 Dec. 1905. He was educated at Harvard and after being in the surrogate's office in New York 1883-6 removed to London, where he edited the 'Yellow Book.' He published 'As It Was Written' (1885), a musician's story; 'Mrs. Peixada' (1886); 'The Land of Love' (1887); 'My Uncle Florimond' (1888); 'The Yoke of the Thorah' (1887); 'Mr. Sonnenschein's Inheritance' (1888); 'A Latin-Quarter Courtship'; 'Comedies and Errors' (1898); 'Cardinal's Snuff-box' (1900); etc., books which have been extensively circulated in both America and England.

Harland, Marion. See TERHUNE, MARY VIRGINIA.

HARLECH — HARLOWE

Harlech, hār'lēh, Wales, an ancient town, the former capital of Merionethshire, situated on the coast, 10 miles north of Barmouth. On a steep hill overlooking the sea is the castle, which held out for the Lancastrians in the wars of the Roses, and later for Charles I. The 'March of the Men of Harlech' commemorates its capture by the Yorkists in 1468.

Harlem, a part of New York city above 106th street, between the East and Harlem Rivers and Eighth Avenue. See NEW YORK CITY. It was formerly a town of Westchester County, but is now incorporated in New York City. The extension of the elevated railway and subway systems has caused it to come thickly settled as a residential quarter, while its business activities, both commercial and manufacturing, have likewise greatly increased. Its main thoroughfare is 125th Street, which is occupied throughout extent with retail establishments of various kinds. Crosstown car lines run on 125th and 116th Streets. Between 124th Street on the north, 120th Street on the south and Madison and Mt. Morris Avenues on the east and west, respectively, lies Mt. Morris Park.

Harlem Plains, Battle of, in the Revolutionary War, a conflict on 16 Sept. 1776, which followed Howe's occupation of New York and Manhattan Island. On the Harlem Plains or Flats an advance guard of British troops came into contact with a body of Virginian and Connecticut troops commanded respectively by Majors Leitch and Knowlton. In attempting to flank the enemy Knowlton was killed, and by Washington's orders the Americans retreated, with a loss of 60 killed and wounded.

Harlem River, the name given to the tidal channel north of the island of Manhattan, which separates the boroughs of Manhattan and the Bronx, in New York. The Harlem is connected with the Hudson River by Spuyten Duyvil Creek, and extends south by east about seven miles to East River. Randall's Island is at its entrance to East River. In 1895 a ship-canal was opened which connects the Hudson and the Harlem south of the Spuyten Duyvil channel. A number of bridges span the Harlem, the finest being High Bridge, an aqueduct bridge, and Washington Bridge which crosses the river a little north of a point opposite Fort Washington on the Hudson. Along the western shore is the excellent roadway called the Speedway, and on the same side of the river are the polo and ball grounds, the High Bridge park and a number of fine public and private buildings.

Harlequin, hār'lē-kīn or -kwīn (French, *arlequin*, Italian *arlechino*), a word of doubtful origin, but probably from old French *Hellequin*, *Herlequin*, the name of a demon figuring in mediæval legends; this again is supposed to be of German origin, its elements corresponding to English "hell" and "kin." Riccoboni conjectures ('History of the Italian Theatre') that the dress of the harlequins is no other than the *centunculus* of the old Roman *mimi* or mimes, who were players in ridiculous pieces or farces of a loose character. The character of the ancient harlequin was a mixture of extravagant buffoonery with great bodily agility. But in the middle of the 16th century his character was essentially changed. He became a simple, ignorant servant, who tries very hard to be witty, even at the

expense of being malicious. He is a chameleon, who assumes all colors, and can be made, in the hands of a skilful actor, the principal character on the stage. He must excel in extempore sallies. This account applies more particularly to the Italian harlequin. The gallant, obsequious French harlequin is an entirely national mask. In the vaudeville theatre he is silent, with a black half-mask, and reminds one throughout the representation of the grace and agility of the cat. In Great Britain, in the Christmas pantomimes, he becomes a lover and a magician; and in exchange for the gift of language, of which he has been deprived, he has been invested with a wonder-working wand. With this wand he protects his mistress, the columbine, against the clown and pantaloons, who pursue and endeavor to capture her, until the pursuit is brought to a termination by a good fairy. The harlequin wears a tight dress of bright colors, and glittering with spangles.

Harlequin Cabbage-bug. See CABBAGE-INSECTS.

Harlequin Duck. See DUCK.

Harlequin Snake. See CORAL SNAKE.

Harley, Robert, 1st EARL OF OXFORD, English statesman: b. London 5 Dec. 1661; d. 21 May 1724. After the accession of Anne he and his colleague St. John, afterward Lord Bolingbroke, became leaders of the Tories. The former was chosen speaker of the House of Commons in 1702, and was chief secretary of state 1704-8. After the fall of Marlborough Harley became chancellor of the exchequer in 1710 and next year was created Earl of Oxford. He and Bolingbroke secured the Treaty of Utrecht (1713), but afterward quarrelled. Early in the reign of George I. he was impeached of high treason on the ground of his alleged Jacobite intrigues, and was kept in the Tower for two years, but owing to the inability of the Peers and the Commons to agree about the mode of procedure, was acquitted. His patronage was extended to Swift, Pope, and other literary men, and he made a valuable collection of books and MSS., which latter are preserved in the British Museum, where they form the 'Bibliotheca Harleiana.' Those which have been printed constitute the 'Harleian Miscellany.'

Harlow, hār'lō, **George Henry**, English painter: b. London 10 June 1787; d. there 4 Feb. 1819. After studying under other masters, he entered the studio of Sir Thomas Lawrence, who used to employ him to dead color. In 1818 he visited Rome, where he astonished the artists there by completing an effective copy of the 'Transfiguration' of Raphael in 18 days. This gained him the friendship of Canova, who procured his election as a member of the Academy of St. Luke. His best original works are two designs from Shakespeare, 'Hubert and Prince Arthur,' and the 'Trial of Queen Catharine.' The principal characters in the latter are portraits of members of the Kemble family; and the figure of Queen Catharine is a likeness of Mrs. Siddons (q.v.). He was eminent as a portrait painter, and his portrait of Fuseli is regarded as a work of great merit.

Harlowe, Clarissa, a novel published by Samuel Richardson in 1748. The story is told by means of letters, and while somewhat prolix



JUDSON HARMON,
GOVERNOR OF OHIO.

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HARMALINE—HARMONIC ANALYSIS

for modern taste, is an accurate record of many of the manners and ideals of the 18th century.

Har'maline and **Harmine**, two alkaloids which occur, probably in the form of phosphates, in the seed-coatings of the harmel or Syrian rue (*Peganum harmala*), a plant growing in the Mediterranean region and in southern Asia. The seeds are extracted with dilute acetic or sulphuric acid, and the hydrochlorids of the two alkaloids are precipitated by the addition of common salt. The precipitate is washed with salt solution, and afterward with water, in which the hydrochlorids dissolve. The filtrate is clarified by animal charcoal and heated to 140° F., after which ammonia is added. Harmine is precipitated first, and by the continued addition of ammonia the harmaline is thrown down subsequently. Harmine has the formula $C_{10}H_{12}N_2O$. It is practically insoluble in ether, and is but slightly soluble in water. It dissolves in alcohol, from which it crystallizes in colorless monoclinic prisms, melting at 495° F. Harmaline is the hydrid of harmine, and has the formula $C_{10}H_{14}N_2O$. It is somewhat soluble in water, ether, and cold alcohol, and dissolves freely in hot alcohol. It crystallizes from solution in alcohol in the form of octahedra belonging to the trimetric system, and melts at about 460° F. The salts of harmine are mostly colorless, while those of harmaline are yellow; and the salts of both of these bases exhibit marked fluorescence. The name "harmaline" is also applied to the coloring matter now more commonly known as fuchsine.

Harmattan, här-mät'an, a land-wind, very dry and hot, blowing upon the coast of Africa between Cape Verde, in lat. 14° 43' N., and Cape Lopez, lat. 0° 36' S., during December, January and February. It is generally attended by fog, through which the sun shines red. It hurts vegetation and injuriously affects man, drying up the eyes, the mouth, etc., even peeling off the skin. On the other hand, it tends to terminate fever and dysentery, and to mitigate cutaneous diseases.

Harmodius (här-mō'dī-ūs) and **Aristogiton**, ä-ris-tō-jī'ton, two Athenian youths who in 514 B.C. killed Hipparchus, the younger brother of the tyrant Hippias, partly because of an insult offered to the sister of Harmodius, and partly with a view to the overthrow of the Pisistratidæ. Harmodius was slain by the soldiers of Hipparchus, while Aristogiton fled, but was afterward taken and executed. Subsequently they came to be regarded as patriotic martyrs, and received divine honors from the Athenians, and had statues raised to their memory. They were strongly attached to each other, and are sculptured in a group in the Museo Nazionale, Naples.

Har'mon, Judson, American jurist: b. Hamilton County, Ohio, 3 Feb. 1846. He was graduated at Denison University, 1866, and at the Cincinnati Law School LL.B. in 1869. Denison in 1891 gave him the honorary degree of LL.D. He practiced law in Wyoming, Ohio, and was elected mayor of that city, filling the office 1875-76. From the mayor's office he passed to the bench of the Court of Common Pleas serving as one of the judges of that court 1876-78 when he was succeeded by William

Howard Taft, Republican. His record in the lower court gained for him a seat on the bench of the Superior Court of Cincinnati where he served 1878-99, and on his resignation he was succeeded by Judge Taft. When President Cleveland, on 10 June 1895, appointed Attorney-General Olney his Secretary of State, his choice to fill the vacancy was Judge Harmon. He served as president of the Ohio Bar Association, 1897-98. The University of Cincinnati in 1896 offered him the chair of law which he accepted and has since held. On 3 Nov. 1908 he was elected Governor of Ohio and reelected in 1910.

Harmonic Analysis, The. "The Harmonic Analysis" is the name first given by Thomson and Tait in their 'Natural Philosophy' to a method extensively and fruitfully employed in investigations in many branches of Mathematical Physics, and first used by Daniel Bernouilli and Euler in the middle of the eighteenth century in studying the musical vibrations of a stretched elastic string.

From the physical side it is described by J. Clerk Maxwell as "a method by which the solution of an actual problem may be obtained as the sum or resultant of a number of terms, each of which is a solution of a particular case of the problem." The method is applicable to physical problems where the actual complicated state under investigation can be regarded as due to the superposition of a number of simpler states that can coexist without interfering with one another.

For example, in dealing with the small oscillations of a musical string it is known that the string is capable of sounding a variety of so-called pure notes, known as the fundamental note, the first harmonic or octave of the fundamental note, and the higher harmonics of the fundamental note, and that the forms of vibration giving these various notes may coexist, so that the string may be sounding at once its fundamental note and its various harmonics and thus be giving a note quite distinguishable from its pure fundamental note though of the same pitch. If we are dealing with the problem of the motion of a string sounding such a complicated note, the harmonic analysis enables us to obtain and to express its solution as a sum of the terms expressing the motions which separately would give the separate pure notes actually present.

From the mathematical side the problems to which the harmonic analysis is applicable are those in which it is necessary to find a solution of a homogeneous linear differential equation which shall satisfy a set of given initial or boundary conditions sufficiently numerous to make the problem determinate. It is well known that if a solution of such a differential equation has been obtained, it may be multiplied by any constant and will still be a solution; and that if several solutions have been obtained, their sum will be a solution. In using the harmonic analysis we attempt by a skilful use of these two principles to so combine simple particular solutions of the differential equation involved in the problem as to form a solution of the equation which satisfies all the given conditions. This usually makes it necessary to analyze some one of the given conditions into a sum or series of simpler so-called harmonic terms, or in other words to develop some function of one of the

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independent variables, or of a set of the independent variables into a series whose terms are of specified form.

For instance, suppose a harp-string of length l initially distorted into a curve whose equation referred to the position of equilibrium of the string as the X -axis and to one end of the string as origin is $y=f(x)$, and then released, and that it is required to solve the problem of the subsequent motion of the string, the initial displacement being small.

Here we have to solve the differential equation

$$\frac{\partial^2 y}{\partial t^2} = a^2 \frac{\partial^2 y}{\partial x^2}, \quad (I)$$

subject to the conditions $y=0$ when $x=0$; $y=0$ when $x=l$; $\frac{\partial y}{\partial t}=0$ when $t=0$; $y=f(x)$ when $t=0$. It is known and is easily verified that $y=\sin \beta x \cos a\beta t$ is a particular solution of (I) if β is any constant. If we take $\beta=\frac{m\pi}{l}$, where

m is any whole number, $y=\sin \frac{m\pi x}{l} \cos \frac{m\pi a t}{l}$ is a solution of (I) which satisfies our first three conditions; and so is

$$y = a_1 \sin \frac{\pi x}{l} \cos \frac{\pi a t}{l} + a_2 \sin \frac{2\pi x}{l} \cos \frac{2\pi a t}{l} + a_3 \sin \frac{3\pi x}{l} \cos \frac{3\pi a t}{l} + \dots, \quad (1)$$

where a_1, a_2, a_3, \dots are any constants. When $t=0$ (1) reduces to

$$y = a_1 \sin \frac{\pi x}{l} + a_2 \sin \frac{2\pi x}{l} + a_3 \sin \frac{3\pi x}{l} + \dots, \quad (2)$$

and if we can choose a_1, a_2, \dots , so that the series in (2) is equal to $f(x)$ for all values of x between 0 and l , (1) becomes our required solution. This calls for the development of $f(x)$ into a Trigonometric Series of somewhat peculiar form known as a Fourier's Series, and when that is accomplished our solution is complete.

Fourier's Series.—It was first shown by Fourier in his researches into the Conduction of Heat in 1812 that

$$f(x) = \frac{1}{2}b_0 + b_1 \cos \frac{\pi x}{c} + b_2 \cos \frac{2\pi x}{c} + b_3 \cos \frac{3\pi x}{c} + \dots + a_1 \sin \frac{\pi x}{c} + a_2 \sin \frac{2\pi x}{c} + a_3 \sin \frac{3\pi x}{c} + \dots, \quad (3)$$

where
$$a_m = \frac{1}{c} \int_{-c}^c f(x) \sin \frac{m\pi x}{c} dx,$$

and
$$b_m = \frac{1}{c} \int_{-c}^c f(x) \cos \frac{m\pi x}{c} dx,$$

for all values of x between $-c$ and c .

If $f(-x) = -f(x)$, that is, if $f(x)$ is an odd function, (3) reduces to

$$f(x) = a_1 \sin \frac{\pi x}{c} + a_2 \sin \frac{2\pi x}{c} + a_3 \sin \frac{3\pi x}{c} + \dots, \quad (4)$$

where
$$a_m = \frac{2}{c} \int_0^c f(x) \sin \frac{m\pi x}{c} dx.$$

If $f(-x) = f(x)$, that is, if $f(x)$ is an even function, (3) reduces to

$$f(x) = \frac{1}{2}b_0 + b_1 \cos \frac{\pi x}{c} + b_2 \cos \frac{2\pi x}{c} + b_3 \cos \frac{3\pi x}{c} + \dots, \quad (5)$$

where
$$b_m = \frac{2}{c} \int_0^c f(x) \cos \frac{m\pi x}{c} dx.$$

If the development need hold good merely for values of x between 0 and c , any one of the forms given above may be employed.

Harmonic Functions.—Laplace's Equation,

$$\frac{\partial^2 V}{\partial x^2} + \frac{\partial^2 V}{\partial y^2} + \frac{\partial^2 V}{\partial z^2} = 0, \quad (II)$$

in the numerous forms it assumes in different systems of coördinates plays a larger part in the various branches of mathematical physics than any other differential equation, and the harmonic analysis is required in a large proportion of the physical problems that obey the law it expresses.

A function which together with its first space derivatives is continuous within a specified region and which satisfies Laplace's equation at every point within the region is said to be *harmonic* in the region in question.

The form to which a harmonic function reduces on one of the level surfaces of the appropriate coördinate system is called a *Surface Harmonic*.

Zonal Harmonics.—The coefficient of x^m in the development of $(1-2\mu z+z^2)^{-\frac{1}{2}}$ in ascending powers of z , where $\mu = \cos \theta$, is represented by $P_m(\mu)$ and is called a *Surface Zonal Harmonic* of the m th degree, or a *Legendre's Coefficient* or *Legendrian*.

It can be shown that $V=r^m P_m(\cos \theta)$ and $V=\frac{1}{r^{m+1}} P_m(\cos \theta)$ are particular solutions of Laplace's equation in spherical coördinates,

$$r \frac{\partial^2 (rV)}{\partial r^2} + \frac{1}{\sin \theta} \frac{\partial}{\partial \theta} \left(\sin \theta \frac{\partial V}{\partial \theta} \right) + \frac{1}{\sin^2 \theta} \frac{\partial^2 V}{\partial \phi^2} = 0. \quad (III)$$

They are called *Solid Zonal Harmonics*. The first form is harmonic within the sphere whose centre is at the origin of coördinates and whose radius is unity, and the second form is harmonic in all space outside of that sphere. They are appropriate functions to use in solving problems where a solution of (III) is required, if it is evident from considerations of symmetry that the solution is independent of the coördinate ϕ .

$$P_m(\mu) = \frac{1 \cdot 3 \cdot 5 \dots (2m-1)}{1 \cdot 2 \cdot 3 \dots m} \left[\mu^m - \frac{m(m-1)}{2(2m-1)} \mu^{m-2} + \frac{m(m-1)(m-2)(m-3)}{2 \cdot 4 \cdot (2m-1)(2m-3)} \mu^{m-4} \dots \right]$$

whence

$$\begin{aligned} P_0(\mu) &= 1, & P_2(\mu) &= \frac{1}{2}(3\mu^2 - 1), \\ P_1(\mu) &= \mu, & P_3(\mu) &= \frac{1}{2}(5\mu^3 - 3\mu), \\ P_4(\mu) &= \frac{1}{8}(35\mu^4 - 30\mu^2 + 3), \\ P_5(\mu) &= \frac{1}{8}(63\mu^5 - 70\mu^3 + 15\mu). \end{aligned}$$

A very important property of the Surface Zonal Harmonic $P_m(\mu)$ which follows readily from its definition is $P'_m(1) = 0$. That is, the function

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reduces to unity at all points on the polar axis.

If, in a problem where V must satisfy Laplace's Equation and there is symmetry about the polar axis, the value of V on the axis is represented by a convergent series $a_0 + a_1 z + a_2 z^2 + \dots$, z being the distance of the point from the origin, then the series formed by writing $r^m P_m(\cos \theta)$ instead of z^m in the given series gives the value of V at any point in space at which the new series is convergent. If the value of V on the axis is represented by a convergent series $\frac{a_1}{x} + \frac{a_2}{x^2}$

$+\frac{a_3}{z^3}+\dots$, then the series formed from the given series by replacing $\frac{1}{z^{m+1}}$ by $\frac{1}{z^{m+1}}P_m(\cos \theta)$ gives the value of V at any point in space at which the new series is convergent.

For instance, if a charge M of static electricity be placed on a conductor in the form of a thin circular disc of radius a , it is known that the charge will so distribute itself that the surface density σ at any point of the disc at the distance

s from its center will be $\sigma = \frac{M}{4a\pi\sqrt{a^2 - s^2}}$.

If the axis of the disc is taken as the polar axis, the value of the Potential Function V due to the charge, at a point of the axis at the dis-

tance x from the centre is $V = \frac{M}{2a} \cos^{-1} \left(\frac{x^2 - a^2}{x^2 + a^2} \right)$.

This can be developed into the series

$$\frac{M}{a} \left[\frac{\pi}{2} - \frac{x}{a} + \frac{x^3}{3a^3} - \frac{x^5}{5a^5} + \dots \right] \quad \text{if } x < a,$$

or $\frac{M}{a} \left[\frac{a}{x} - \frac{a^3}{3x^3} + \frac{a^5}{5x^5} - \frac{a^7}{7x^7} + \dots \right]$ if $x > a$.

Hence

$$V = \frac{M}{a} \left[\frac{\pi}{2} - \frac{r}{a} P_1(\cos \theta) + \frac{1}{3} \frac{r^3}{a^3} P_3(\cos \theta) - \frac{1}{5} \frac{r^5}{a^5} P_5(\cos \theta) + \dots \right] \text{ if } r < a, \text{ and } \theta < \frac{\pi}{2};$$

and

$$V = \frac{M}{a} \left[\frac{a}{r} - \frac{1}{3} \frac{a^3}{r^3} P_2(\cos \theta) + \frac{1}{5} \frac{a^5}{r^5} P_4(\cos \theta) - \dots \right] \quad \text{if } r > a.$$

If, in a problem where V must satisfy Laplace's Equation and there is symmetry about an axis, the value of V on the surface of the sphere $r=a$ is given and can be expressed as a sum or as a series of Surface Zonal Harmonics, the value of V at a point not on the sphere will be obtained by replacing the Surface Zonal Harmonics by the appropriate Solid Zonal Harmonics.

To take a very simple example: If a charge of electricity is placed on a spherical conductor of radius a , it is known that it will so distribute itself that all points on the surface will be at the same potential $\frac{M}{a}$.

Now $\frac{M}{a} = \frac{M}{a} P_0 (\cos \theta)$ and is a Surface Zonal Harmonic. Hence any point at the distance r from the centre of the conductor is at potential

$$\frac{M}{a} \frac{r^0}{a^0} P_0 (\cos \theta) \text{ or } \frac{M}{a} \text{ if } r < a, \text{ and at potential}$$

$$\frac{M}{a} \frac{a}{r} P_0(\cos \theta) \text{ or } \frac{M}{r} \text{ if } r > a.$$

If the value of V on the surface of the sphere had been less simple, say $V = F(\theta) = f(\cos \theta) = f(\mu)$, then $f(\mu)$ would have had to be expressed in the form $a_0 P_0(\mu) + a_1 P_1(\mu) + a_2 P_2(\mu) + \dots$ before we could have used the simple method illustrated above. This can be done by the aid of the formula

$$f(\mu) = a_0 P_0(\mu) + a_1 P_1(\mu) + a_2 P_2(\mu) + a_3 P_3(\mu) + \dots,$$

where $a_m = \frac{2m+1}{2} \int_{-1}^1 f(x) P_m(x) dx$, the development in question holding good when $-1 < \mu < 1$.

For instance, let one half of the surface of a homogeneous sphere be kept at the temperature zero and the other half at the temperature τ ; to find the stationary temperature u of any internal point. Here $f(\mu) = \tau$, $0 < \mu < 1$, and $f(\mu) = 0$, $-1 < \mu < 0$. Consequently

$$a_m = \frac{2m+1}{2} \left[\int_{-1}^0 P_m(x) dx + \int_0^1 P_m(x) dx \right] \\ = \frac{2m+1}{2} \int_0^1 P_m(x) dx.$$

Letting $m=0, 1, 2, \dots$, successively, and using the corresponding values $1, x, \frac{1}{2}(3x^2-1)$, etc., of $P_m(x)$, we get $a_0=\frac{1}{2}, a_1=\frac{1}{2}, a_2=0, a_3=-\frac{1}{2}, a_4=0, a_5=\frac{1}{8}, \frac{1}{2}, \dots$ and $f(\mu)=\frac{1}{2}P_0(\mu)+\frac{1}{2}P_1(\mu)-\frac{1}{2}P_3(\mu)+\frac{1}{8}P_5(\mu)+\frac{1}{2}P_7(\mu)-\dots$

If a is the radius of the sphere, the required temperature

$$u = \frac{1}{2} + \frac{3}{4} \frac{r}{a} P_1(\cos \theta) - \frac{7}{8} \cdot \frac{1}{2} \frac{r^3}{a^3} P_3(\cos \theta) + \frac{11}{12} \cdot \frac{1}{2} \cdot \frac{3}{4} \frac{r^5}{a^5} P_5(\cos \theta) \dots$$

Tables giving the numerical values of the Surface Zonal Harmonics have been computed and are accessible, and by their aid numerical results can be obtained in such problems as those we have been considering as readily as if we were using simple trigonometric functions. The following is such a table carried only to three places.

TABLE I.—SURFACE ZONAL HARMONICS.

θ	$P_1(\cos \theta)$	$P_2(\cos \theta)$	$P_3(\cos \theta)$	$P_4(\cos \theta)$	$P_5(\cos \theta)$
0°	1.000	1.000	1.000	1.000	1.000
10	.985	.955	.911	.853	.784
20	.940	.824	.665	.475	.272
30	.866	.625	.325	.023	-.223
40	.766	.380	-.025	-.319	-.420
50	.643	.120	-.300	-.428	-.254
60	.500	-.125	-.438	-.289	.090
70	.342	-.324	-.413	-.004	.328
80	.174	-.455	-.247	.266	.281
90	.000	-.500	.000	.375	.000

Legendrians were first used by Legendre in a paper published in 1785 on the attraction of solids of revolution.

Laplace's Coefficients. — $P_m(\cos \gamma)$, where $\gamma = \cos \theta \cos \theta_1 + \sin \theta \sin \theta_1 \cos(\phi - \phi_1)$, and is the angle made by the radius vector with a fixed

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line through the origin whose direction is given by the angles θ_1 and ϕ_1 , is called a Laplace's Coefficient or Laplacian, the fixed line being called the Axis and its intersection with the unit sphere the Pole of the Laplacian. A Surface Zonal Harmonic $P_m(\cos\theta)$ is merely a Laplacian whose axis coincides with the axis of coördinates. $r^m P_m(\cos\gamma)$ and $\frac{1}{r^{m+1}} P_m(\cos\gamma)$ are solutions of Laplace's Equation (III). The first is harmonic within and the second without the unit sphere.

Laplacians may be used in problems symmetrical about an axis if the axis does not coincide with the axis of coördinates just as Zonal Harmonics are used when the problem is symmetrical about the polar axis.

Laplacians were first used by Laplace, in one of the most remarkable memoirs ever written, in determining the attraction of a Spheroid. The paper in question was published in 1782.

Spherical Harmonics.—A Surface Spherical Harmonic of the m th degree Y_m may be most simply defined as the function obtained by dividing a rational, integral, homogeneous, algebraic polynomial of the m th degree in x, y, z which satisfies Laplace's Equation (I), by

r^m , that is, by $(x^2 + y^2 + z^2)^{\frac{m}{2}}$. For example, $\frac{1}{r}(x + y + z)$, $\frac{1}{r^2}(x^2 + xy + y^2)$, $\frac{1}{r^3}(2xz - 3xy^2 - 3xz^2)$ are Surface Spherical Harmonics of the first degree, of the second degree, and of the third degree, respectively.

It is clear that $r^m Y_m$ satisfies Laplace's Equation. The same thing can be shown of $\frac{1}{r^{m+1}} Y_m$. The first is harmonic within, the second without, the unit sphere. They are known as Solid Spherical Harmonics.

It is clear that if the value of V on the surface of a sphere whose centre is the origin can be expressed as a sum of terms each of which is a surface Spherical Harmonic, its value at any point not on the surface is the sum of the appropriate corresponding Solid Spherical Harmonics.

It can be shown by transforming from spherical to rectangular coördinates that the Surface Zonal Harmonic $P_m(\mu)$ or $P_m(\cos\theta)$ and the Laplacian $P_m(\cos\gamma)$ are Surface Spherical Harmonics, and by the reverse transformation that the general Surface Harmonic Y_m can be formulated as

$$Y_m = A_0 P_m(\mu)$$

$$+ \sum_{n=1}^{n=m} \left[(A_n \cos n\phi + B_n \sin n\phi) \sin^n \theta \frac{d^n P_m(\mu)}{d\mu^n} \right].$$

A function given arbitrarily on the surface of the unit sphere, i.e., a function of θ and ϕ , if expressed as a function of $\cos\theta$ and ϕ can be developed into a series of Surface Spherical Harmonics by the formulas

$$f(\mu, \phi) = \sum_{m=0}^{m=\infty} \left\{ A_{0,m} P_m(\mu) + \sum_{n=1}^{n=m} \left[(A_{n,m} \cos n\phi + B_{n,m} \sin n\phi) \sin^n \theta \frac{d^n P_m(\mu)}{d\mu^n} \right] \right\},$$

$$A_{0,m} = \frac{2m+1}{4\pi} \int_0^{2\pi} d\phi \int_{-1}^1 f(\mu, \phi) P_m(\mu) d\mu,$$

$$\frac{2\pi}{2m+1} \frac{(m+n)!}{(m-n)!} A_{n,m}$$

$$- \int_0^{2\pi} \int_{-1}^1 f(\mu, \phi) \cos n\phi \sin^n \theta \frac{d^n P_m(\mu)}{d\mu^n} d\mu$$

$$\frac{2\pi}{2m+1} \frac{(m+n)!}{(m-n)!} B_{n,m}$$

$$- \int_0^{2\pi} d\phi \int_{-1}^1 f(\mu, \phi) \sin n\phi \sin^n \theta \frac{d^n P_m(\mu)}{d\mu^n} d\mu$$

The following theorems concerning the integration of Spherical Harmonics are important. We give them without proof.

The integral of the product of two Surface Spherical Harmonics $Y_m Y_n$ of different degrees taken over the surface of the unit sphere is equal to zero.

The integral over the surface of the unit sphere, of the product of a Surface Spherical Harmonic by a Laplacian of the same degree, is

$$\frac{4\pi}{2m+1}$$
 multiplied by the value the Spherical Harmonic assumes at the Pole of the Laplacian.

These theorems enable us to solve many problems in the theory of Gravitation and the theory of Electrostatics by direct integration.

Bessel's Functions.—A Bessel's Function or Surface Cylindrical Harmonic of the n th order $J_n(x)$ may be defined as the coefficient of x^n in

the development of $e^{\frac{z}{2}(s+\frac{1}{s})}$ into an ascending Power Series in z . It can be shown that

$$V = \cosh(\mu z) (A \cos n\phi + B \sin n\phi) J_n(\mu r)$$

and

$$V = \sinh(\mu z) (A \cos n\phi + B \sin n\phi) J_n(\mu r),$$

where μ is any constant, are solutions of Laplace's Equation in Cylindrical Coördinates

$$\frac{\partial^2 V}{\partial r^2} + \frac{1}{r} \frac{\partial V}{\partial r} + \frac{1}{r^2} \frac{\partial^2 V}{\partial \phi^2} + \frac{\partial^2 V}{\partial z^2} = 0. \quad (IV)$$

The Bessel's Functions most used are $J_0(x)$ and $J_1(x)$, which are appropriate when the problem has axial symmetry about the Axis of Z .

$$J_0(x) = 1 - \frac{x^2}{2^2} + \frac{x^4}{2^2 \cdot 4^2} - \frac{x^6}{2^2 \cdot 4^2 \cdot 6^2} + \dots,$$

and is convergent for all values of x .

$$J_1(x) = -\frac{dJ_0(x)}{dx}.$$

Important properties are given by the formulas

$$\int_0^x J_0(x) dx = x J_1(x)$$

and

$$\int_0^x x \{ J_0(x) \}^2 dx = \frac{1}{2} x \{ J_0(x) \}^2 + \{ J_1(x) \}^2,$$

and the following formulas for development in Cylindrical Harmonic Series, the development holding good for values of r between 0 and a .

$$f(r) = \sum A_n J_0(\mu_n r),$$

where μ_n is a root of the transcendental equation in μ , $J_0(\mu a) = 0$, or of $J_1(\mu a) = 0$, or of

$$\mu a J_1(\mu a) - \lambda J_0(\mu a) = 0,$$

and

$$A_s = \frac{2}{a^2 \{J_0(\mu_s a)\}^2 + \{J_1(\mu_s a)\}^2} \int_0^a r f(r) J_0(\mu_s r) dr.$$

For the important case where $f(r) = 1$,

$$A_s = \frac{2}{\mu_s a^2 \{J_0(\mu_s a)\}^2 + \{J_1(\mu_s a)\}^2} J_1(\mu_s a).$$

As an example in the use of Bessel's Functions let us find the stationary temperature of any point (r, z) in a homogeneous cylinder of radius a and altitude b if the convex surface and one base are kept at the temperature zero and the other base at the temperature 1 .

Here we seek a solution V of equation (IV) which reduces to zero when $z = 0$, and when $r = a$, and to 1 when $r = b$. By the aid of the formulas above this is easily formed and is

$$V = \frac{2}{\mu_1 a J_1(\mu_1 a) \sinh(\mu_1 b)} J_0(\mu_1 r) + \frac{2}{\mu_2 a J_1(\mu_2 a) \sinh(\mu_2 b)} J_0(\mu_2 r) + \frac{2}{\mu_3 a J_1(\mu_3 a) \sinh(\mu_3 b)} J_0(\mu_3 r) + \dots$$

If numerical results are desired, tables for $J_0(x)$ and $J_1(x)$ are needed. Such tables have been computed and are accessible. We give here a small three-place one.

TABLE II.—BESSEL'S FUNCTIONS.

x	$J_0(x)$	$J_1(x)$	x	$J_0(x)$	$J_1(x)$
0.0	1.000	0.000	5.0	-.178	-.328
0.5	.938	.242	5.5	-.007	-.341
1.0	.765	.440	6.0	.151	-.277
1.5	.512	.558	6.5	.260	-.154
2.0	.284	.577	7.0	.300	-.005
2.5	-.048	.497	7.5	.266	.135
3.0	-.280	.339	8.0	.172	.235
3.5	-.380	.137	8.5	-.042	.273
4.0	-.397	-.066	9.0	-.090	.245
4.5	-.320	-.231	9.5	-.194	.161
5.0	-.178	-.328	10.0	-.246	.044

TABLE III.—ROOTS OF BESSEL'S FUNCTIONS.

n	x_n for $J_0(x_n) = 0$	x_n for $J_1(x_n) = 0$
1	2.405	3.832
2	5.520	7.016
3	8.654	10.173

Bessel's Functions of the zeroth order were first used successfully in the Harmonic Analysis by Fourier in 1812, in dealing with the flow of heat in a right circular cylinder.

Other more complicated Harmonic Functions are Lamé's Functions or Ellipsoidal Harmonics, Conal Harmonics, Toroidal Harmonics, etc. Each set is adapted to dealing with Laplace's Equation expressed in a suitable system of Curvilinear Coordinates.

Bibliography.—For general treatises on the Harmonic Analysis and on the Harmonic Functions the reader is referred to Heine, 'Handbuch der Kugelfunktionen' (second edition, 1878); Todhunter, 'The Functions of Laplace, Lamé, and Bessel' (1875); Thomson and Tait, 'Natural Philosophy' (Appendix B, 1879); Ferrers, 'Spherical Harmonics' (1881); Byerly, 'Fourier's

Series, and Spherical Harmonics' (1895); Gray and Matthews, 'Bessel's Functions' (1895). An excellent account of the history of the subject with detailed references to the early papers, memoirs, and other publications, prepared by Professor M. Böcher, will be found at the end of Byerly's above-mentioned treatise. For the contemporary literature see the recent volumes of the 'Jahrbuch über die Fortschritte der Mathematik' under the heading Kugelfunktionen und verwandte Funktionen.

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Harmon'ica, a musical instrument invented by Benjamin Franklin in 1762. It is formed of a number of glasses of water, and is played by touching them with the dampened finger. The less the quantity of water, the lower the tone of the scale. The name is also applied to a small wind instrument, or mouth-organ, which has a series of holes to conduct the breath to free reeds, like those of an accordion.

Harmon'icon, a chemical apparatus consisting of an open glass tube, the air in which may be made to give a sound resembling a musical note, when held over burning hydrogen. The note depends upon the size of the flame and the length of the tube.

Harmon'ics, the accessory or collateral sounds accompanying the primary, fundamental, or predominant tone of any string, pipe, or other sonorous body, and constituting in varying degrees what in English is known as 'quality,' in French as 'timbre,' and in German as 'Klangfarbe.' No purely simple sound—one whose vibrations are all in the same period—is producible. When

a sound is produced by the vibration of an open string, the whole string vibrates as a unity, giving rise to a tone called the fundamental. The string, however, further divides into various sections, which vibrate separately and more rapidly, and produce sounds—the harmonics—differing from the fundamental, but bearing certain fixed proportions to it. By whatever vibrating body a musical sound is evoked harmonics also are produced; and although some of the harmonics are suppressed by modifying circumstances, some are always present. There is a regular succession of intervals in which the harmonics naturally accompany a fundamental sound, which is represented in the following scale of vibrations: 1 2 3 4 5 6 7, etc. These also are the intervals which produce the successive chords in harmony, although the natural harmonics when produced further go beyond the range of harmony which human ears can recognize or musical instruments produce at the will of the performer. (See illustration.) 1 is the interval of the octave; 2 is the fifth; 3 is the fourth; 4 is the major third; 5 the minor third; from 6 to 7 is already beyond the range of production on a keyed instrument, but is recognized by musicians as the complement of a four-part simple chord, and is represented approximately on the pianoforte, by E flat, for example, for the key of F.

A musical tone, then, is always complex, but the harmony which attends it is not always the



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same. The different structure of different instruments suppresses now some, now others, of the succession of harmonics, and a different body of tone is thus produced, distinguishing a note in one instrument from the same note in another. Hence the distinctive construction of the pianoforte in which dissonant harmonics are suppressed, and on the other hand, the use in the organ of mutation and mixture stops—the thirteenth and fifteenth—whereby the consonant harmonics of a given tone are much emphasized. Again, many of the higher harmonics are strongly dissonant both with the fundamental tone and with each other, whence arises the discordant quality of such instruments for instance as the cymbals. Harmonics are also called "overtones," and all the primary and secondary tones constituting an actual tone are frequently termed "partials" or "partial tones," the fundamental tone being the first partial, and the harmonics, the upper partials. See HARMONY.

Harmonics, Spherical. See HARMONIC ANALYSIS.

Har'monists, also called RAPPISTS and ECONOMITES, a religious-socialistic community founded in 1787 by George Rapp (1757-1847), a German of Württemberg. The peaceable and spiritual tenets of the organization aroused antagonism and persecution, and in 1803 they emigrated to America, settling in the Connoquenessing Valley, where the Harmony Society was established on a working basis. By 1805, houses, churches, mills, and manufactories had been built, and the settlement had a population of 750 persons. In 1815 they removed to Posey County, Ind., where they founded New Harmony (q.v.); 10 years later, however, they returned to Pennsylvania, and built the township of Economy, in Beaver County, on the Ohio, 20 miles north of Pittsburg. In 1832, a German adventurer, Bernhard Müller, settling among them, caused dissensions and a split in the society; a separation and apportionment of the property was agreed upon, and 250 members retired. They held all property in common, believed in the second coming of Christ, the near advent of the millennium, and practised celibacy. As a result of the latter condition, the membership in 1902 was reduced to eight, and the valuable estate will pass finally into the hands of the last survivor. Consult Hinds, 'American Communities' (1902); Nordhoff, 'The Communist Societies of the United States' (1874).

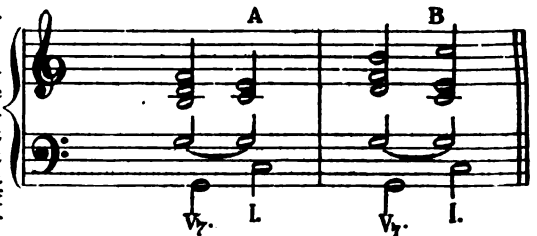
Harmon'ium, a modern musical instrument which produces sounds resembling those of the organ. The invention is ascribed to Alexandre Debain of Paris; but he has at the most merely the credit of perfecting an instrument previously known, called the *orgue expressif*, a kind of organ furnished with an apparatus of free vibrating reeds, intended to increase or diminish the intensity and volume of the sound, by regulating the pressure of the wind, by the aid of which the sounds were produced. The instrument has a keyboard like that of a piano, and when one of the keys is pressed down a valve is opened, which allows the wind from the bellows to rush through one of the wind-boxes and act on the vibrator. There are also several stops, like organ stops, by means of which the performer can direct the stream of wind into the wind-boxes, which produce a flute,

clarinet, or any other sound, according to the number of stops which the instrument possesses. Such is the harmonium which was patented by Debain in 1840, but since that time various other improvements of more or less value have been made. The chief of these are the addition of a knee action, which either serves as an expression stop, or brings all the stops of the instrument into play at once, and what is called the percussion action, the invention of Kaufmann of Dresden, which consists in the application of a small hammer, which strikes the vibrator as soon as the key is pressed down, and thus aids the action of the wind.

Harmony, (from the Greek ἀρμόζειν, to join or fit together), in music is the science which controls the relationship of chords, and decides that of the dissonant elements in a discord to the fundamental concord; the fundamental law being that discord is an unfinished design which requires concord for its completion.

A chord, or combination of tones, in any scale or key may be a concord or discord. The one concord in a major key consists of the key-note or tonic with its major third and fifth. This means of course the tonic triad; but in every major key there are two other major triads, absolutely equal in consonance with the tonic triad—those founded on the dominant and subdominant. In a minor key the triad on the keynote consists of the tonic with a minor third and perfect fifth. The major third and fifth are the notes which produce, naturally, a perfect sound in combination; they are called "consonances," and any foreign element is a "dissonance." They can be inverted, that is, any tone of a chord can be in the bass or lowest part. (See FUNDAMENTAL NOTE, TONE, OR BASS.) This, the "common chord" or "major triad," makes a starting point and a point of finality, from which the harmonies proceed, diverge and converge, and into which they resolve themselves finally.

The seventh harmonic of nature (see HARMONICS), which is one semitone less than the seventh consecutive note in an ascending major scale, constitutes a minor seventh, and produces a discord, which, with its complementary or fulfilling concord, is the foundation of all harmony. This discord, the "dominant seventh"—signed V₇, must always be "resolved" into the



chord of the tonic (I) of the key to which it belongs. (See illustration.)

A is an example of "close," B of "open" or "extended" harmony. The discord on G instinctively demanding the chord of C as its resolution, the note G, or the similar fifth degree in any scale, is called the "dominant"—signed V₇, of that key, and the chords and discords built on it constitute the dominant harmonies. Position B is the most satisfactory to the ear, be-

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cause of the effect of finality induced by the resolution to the first position of the triad. The two chords together form the dominant or authentic cadence—the most important of those terminal phrases which serve the same purpose in music as the marks of punctuation in literary composition. "My country, 'tis of thee" exhibits examples of two other important cadences, showing at the same time how these mark the completion of more or less final musical periods.



The first period is closed at A by a "half" or "imperfect" cadence—that is, the order V.—I. is reversed; the second at B by a "false" or "deceptive" cadence—that is, the dominant chord, instead of proceeding to the tonic, "deceives" the ear by proceeding to another chord; the third period is brought to a close by the authentic cadence at C.

The dominant chord can also bear the more elaborate dissonances of the 9th, 11th, and 13th, as well as the 7th, but it is impossible here to enter into the varieties of discord—"suspensions," "double-root chords," etc., into the analogous discords which may be built on the tonic as a ground-note, or the chords belonging to the minor scale. Suffice it to say the effects which can be evolved from the almost innumerable inversions and involutions of single chords and combinations of chords are subject to stringent natural laws, and the possibilities of variety are infinite.

An important branch of harmony, however, must be mentioned, that is "modulation" or change from one key (or "mode") to another. Modern scales have had the relation of their intervals so modified (see TEMPERAMENT) as to be approximately alike. By the addition of a single sharp or flat any melody can proceed from the key of C to G (with F \sharp), F (with B \flat), or A minor (with G \flat). These—the dominant, subdominant (next below the dominant), and the minor of the sixth degree—are the keys of the first relation, as out of the seven notes which constitute each scale six are present in the scale of C, thus providing as it were six

more or less convenient bridges by which to pass from one key to the other. The conventionality of these modulations makes them inadequate to convey the more passionate coloring of modern music, and more striking changes to remoter keys are necessary. A favorite device with modern composers is to take advantage of the "tempered" system, and by using one note in two significations (for example, F \times E \sharp) to secure means of startling and also of very tender effects in modulation.

Harmony comparatively is of modern growth. In counterpoint (q.v.), the science which preceded harmony, attention was given altogether to the correct progression of the individual voices or parts, while the combinations made by the voices at any moment were regarded as merely accidental. But unconsciously the ear of musicians was being cultivated, and in the richness of Palestrina's simpler writings was shown the possibility of obtaining undreamt-of effects from chords as integral units in a march of harmonies, rather than accidental combinations of independent melodies. One of the fundamental rules of counterpoint was that a dissonance must either be "prepared"—that is, it must appear as a consonance in the previous chord—or else it must be approached very gradually. This rule of the old science was disregarded by Monteverde (1608), who used unprepared discords, and at one blow released the new feeling for chords from its bondage to counterpoint.

Only those who understand counterpoint and harmony can appreciate the full importance of the new departure. It meant that discords were no longer mere variations of concords, but individual creations with an individual's rights and duties. The discord most easily used was the dominant seventh, the first discord produced by nature's harmonics; and so the relation of dominant to tonic—the central idea of all harmony—developed from an increasingly general tendency into a recognized rule. During the 17th century many experiments were made by Monteverde's followers, until at the end of the century Rameau's famous treatise called attention to the fact that all chords are derived from some note which is the generator or root, and the relationships of these roots govern the progressions of the harmonies. The less known, but hardly less important, researches of Tartini formed a good supplement to Rameau's theory; and the basis of scientific harmony established by these two works was not seriously disturbed even by the thorough investigation and the astonishing discoveries of Helmholtz, who extended the foundation and built a complete superstructure thereon. In the meantime, notwithstanding that theorists fought each other with great fierceness, the science made extraordinary progress under such practical harmonists as Bach, Mozart, and Beethoven, while Wagner, who handled any number of parts as easily as did Bach himself, so enlarged the possibilities of harmony that it is difficult to conceive of any further advance. Consult the manuals by Bannister, Bowman-Weitzmann, Jadassohn, Macfarren, Ouseley, Richter, and Riemann.

Harmony of the Spheres, a hypothesis of Pythagoras and his school, according to which the motions of the heavenly bodies pro-

duced a music imperceptible by the ears of mortals. He supposed these motions to conform to certain fixed laws, which could be expressed in numbers, corresponding to the numbers which give the harmony of sounds.

Harmotome, här'mō-tōm, a mineral of the zeolite family; a hydrous silicate of aluminum and barium, invariably occurring in twin crystals of various colors from white to red-brown.

Harms'worth, Alfred Charles, English journalist and newspaper proprietor: b. Chapelizod, County Dublin, Ireland, 15 July 1865. He has owned and edited, from 1888, a successful periodical, *Answers*; acquired the *Evening News* in 1894; and founded the *Daily Mail* in 1896, the last being the first half-penny newspaper in England. In the course of his journalistic career he has edited or published various other publications. In 1894 he equipped the Arctic expedition under F. G. Jackson. In 1900 he visited the United States, when, in recognition of his extensive journalistic experience, he was given charge of one issue of a New York daily. He was raised to the baronetcy in 1904, and two years later was knighted. His interests are quite varied, as is shown by his editorship of the volume on 'Motors and Motordriving' (in the Badminton Library, 1904).

Harnack, här'näk, Adolf, German theologian: b. Dorpat 7 May 1851. He began his studies in his native town in 1869 and in 1874 took up his residence at Leipsic, for the purpose of pursuing a course in church history, and was made extraordinary professor there in 1876, and ordinary professor of theology, first at Giesesen in 1879, and eventually at Berlin 1889. In 1890 he was made a member of the Berlin Academy. He has been a prolific writer, both in theology and church history, and some of his books have given rise to much controversy; among his works are: 'Lehrbuch der Dogmengeschichte' (1894); 'Die Ueberlieferung und der Bestand der altchristlichen Litteratur' (1893); 'Texte und Untersuchungen' (1882-94); 'Martin Luther' (1901); 'Das Mönchtum' (1903); 'Geschichte' (1893); 'Chronologie der altchristlichen Litteratur Cis Eusebius' (1904); 'Das Wesen des Christentums' (1900); 'Das Apostolische Glaubensbekenntnis' (1897); 'Die Mission und Ausbreitung des Christentums' (1902); 'Reden und Aufsätze' (1903).

Harness and Saddlery Trade, The. It is extremely difficult to trace the history of the harness and saddlery industry in America as far back as the days of the colonies, for in that period of our existence as a nation oxen were so generally used for purposes of plowing and carting that harnesses were in small demand. Those were the days in which roads were so poor that driving could scarcely be regarded as a pleasure, and the equipments required in saddle riding were chiefly imported from England.

The first attempt to make saddlery hardware, one of the most important accessories to the saddlery trade, was inaugurated by Seth J. and Alvin North, at New Britain, Conn. Originally engaged in the blacksmithing business, they began to extend the facilities of their shop until they were finally making bridle-bits, and other

harness equipments, including shoe-buckles, and rings to be used for a variety of purposes. All these articles were originally produced from wire drawn out by hand. Later, horse-power was introduced for this purpose, but it was many years before all the finishing work on these products, the polishing, the welding, etc., ceased to be a matter of manual labor. The discovery of a more rapid method of polishing was made by a blacksmith at Middletown, Conn., to whom Alvin North paid \$25 to learn the process, which simply consisted in taking an old woolen stocking, which, after all the holes had been darned, was filled with the articles to be polished. A number of small pieces of soap were added, after which the stocking was dipped in a pail of warm water and was rubbed briskly between the hands. This method of polishing was finally improved by the substitution of canvas bags for the stockings, but, with this exception, no better process was found until the tumbling-barrels were introduced.

The advent of better roads, and the corresponding increase in the popularity of driving and riding, was the means of creating a greater demand for both saddlery and harness. To meet these requirements of the trade, factories were established at Newark, N. J., Hartford, Conn., St. Louis, Mo., Wheeling, W. Va., Louisville, Ky., and Cincinnati, O., but the greater part of the harness made in those days was suitable only for the heavy stages and wagons, which were then so generally utilized both for the transportation of passengers and in business traffic. At that period in our history the movement for the betterment of roads had been confined almost exclusively to the more populous sections of the East, and as the black soil of the western prairies made the use of wagons practically impossible during certain seasons of the year there was an insistent call for heavy riding saddles. Those that were made in foreign countries had proved to be utterly unsuited, either for the rough frontier life of the West, or for the hard usage which they received in the South, and, as the result of these conditions the manufacturers of saddlery, with the characteristic inventive genius of the Yankee, devised the tree made of wood, and covered with rawhide, with long skirts and fenders to act as a protection, both from the elements and the many deep quagmires which the rider was quite certain to encounter.

It was in 1828 that the Franklin Institute presented a medal to Seth Boyden for his achievement in inventing the first buckles and bits made of annealed cast iron. The discovery had been made by putting a few pounds of cast iron into an ordinary cooking stove, in which, in the process of baking, it became annealed, a process which was largely responsible for the early success of the manufacture of saddlery hardware in this country. About the same time, Peter Hayden, then 22 years of age, began to manufacture hames and saddlery at Auburn, N. Y. His shop was a small one, and as there was little demand for such goods in his neighborhood, he extended his trade by loading his sleigh or wagon with his stock and peddling it through Central New York and Canada. By these methods his business became so well established that, in 1835, he entered into a contract with the State of Ohio, by which he agreed

HARNESS AND SADDLERY TRADE

to furnish employment for its convict labor in the making of hames, saddle-trees, saddlery hardware, and chains. At times he employed upward of 300 convicts, to say nothing of a large force of free labor, and he was soon able to open connections for the sale of his product with the largest mercantile houses in Chicago, St. Louis, Cincinnati, Detroit, Galveston, San Francisco, and New York.

The first horse-collars regularly manufactured in this country were made by Timothy Deming, in East Hartford, Conn., in 1828. Prior to this time the making of horse-collars had been the work of itinerant laborers, who traveled from place to place, hiring themselves to make collars for individuals who were in need of several, or to any local harnessmaker whose stock might need replenishing. When Deming invented and patented his short-straw collar and the block upon which it was made, the event marked the first stage in the development of collar-making in America.

Although the wax-thread, chain-stitch sewing-machine was invented by a New England concern, as early as 1853, it was three years later before it had attained such practicability that it could be used in the sewing of boots and shoes, and fully 10 years before it was applied to the making of harness. Even then the prejudice against machine-stitching was so great that such products were not easily disposed of, and it was only the enormous reduction in cost that ultimately brought it into favor. Another important improvement came in 1858, when W. K. Thornton, of Niles, Mich., perfected the invention of the creasing-machine, but so slow was the trade of those days in the matter of adopting any process which necessitated a radical departure from the old-time and traditional methods that the inventor found that the only way in which he could introduce his machines was to leave them on three months' trial at such shops as would accord him this privilege. A few years later, he entered into partnership in Cincinnati, under the firm name of Thornton & Perkins. In 1865 the business was sold to Randall & Company, the concern which is now engaged in the manufacture of similar, but vastly improved machinery. In fact, the sewing-machine and the creasing-machine were such important inventions that they may be said to have practically revolutionized the industry of harness-making. Other inventions have been patented, but few of them have been of lasting benefit to the trade. The most important, perhaps, was the iron gigtree which was patented by Samuel E. Thorpkins, of Newark, N. J., in 1872.

It was about this time that the harness industry began to enjoy a period of almost phenomenal progress. The invention of labor-saving devices enabled manufacturers to produce goods at a cost which naturally tended to increase the demand for such articles.

Among the inventions which were patented at about this time one must mention the Bosworth lock-stitching, wax-thread sewing-machine, which first appeared in 1872, as well as the Campbell lock-stitching machine, patented first in 1880. With the introduction of these inventions, hand-sewed harness largely disappeared, for these stitches, which were interlocked, made the sewing alike on both sides, which gave the appearance of hand work, a

great improvement upon the product of the old harness-sewing machines which produced a sometimes unsatisfactory chain-stitch. The other kinds of harness machinery which have proved themselves such great labor-saving inventions that they are now regarded as indispensable in all well-equipped factories are the tubular riveting-machines, which entirely dispensed with the old processes of hand riveting; the box-loop sewing-machines, which now sew up all the long loops formerly sewed by hand; the quilting-machines, by means of which pads, gig and riding saddles are quilted; the power trace-trimmers, and trace-polishers; the power splitters, and the dieing-out machines. The first factory for the making of harness thread in this country was established at Paterson, N. J., by Barbour Brothers, in 1863, prior to which time such thread had been imported from Ireland, while the hard-rubber-covered harness trimmings were invented by Andrew Albright, of Newark, N. J., in 1867.

The great development in the making of horse-collars dates only from 1883, for it was in that year that William Fogelson, of Dayton, O., invented a machine for the stuffing of collars. Some 10 years later R. Brownson, of St. Paul, Minn., perfected a metal-staple machine for sewing collars, and, with these two practically recent innovations, one set of machinery will now do the work which formerly required the labor of some 20 men. It was by means of such machinery, practically all of which is due to American push and enterprise, that the trade of saddlery and harness-making has been advanced from a position of inferiority to a commanding place among the great industries of the United States. To comprehend the extent to which this business has progressed it is only necessary to glance at the following table in which the figures prepared by the census bureau are recapitulated:

	1880	1890	1900
Establishments...	7,999	7,931	12,934
Capital.....	\$16,508,019	\$35,346,620	\$43,354,136
Wage earners....	21,446	23,672	24,123
Wages.....	\$7,997,752	\$10,908,918	\$10,725,647
Cost of materials.	\$19,968,716	\$24,674,225	\$33,127,926
Value of products.	\$38,081,643	\$52,970,801	\$62,630,902

The fever for the organization of combinations, "trusts," and other associations had its natural effect upon some of the saddlery manufacturers, and, in 1890, the first move was made toward the establishment of an organization for conference and mutual improvement. This initiative was taken by the Western manufacturers who called a meeting of the trade to be held at St. Louis, Mo., and it was at this time that the organization known as "The National Wholesale Saddlery Association of the United States," was formed. According to the terms of the constitution adopted at this first gathering, the objects of the association were to correct abuses, adopt uniform terms, and encourage a more fraternal feeling among competitors, but, although its annual meetings and elections have been held, and men prominent in the trade have been elected as officials, its effect upon the growth of the industry is entirely problematic. See CARRIAGE AND WAGON INDUSTRY.

HARNESSED ANTELOPES—HARP

Harnessed Antelope. See BUSHBUCK.

Har'nett, Cornelius, American statesman: b. England 20 April 1723; d. North Carolina 1781. He came in early life to America, and was one of the earliest to denounce the stamp act and kindred measures. In 1770-1 he was representative of Wilmington, N. C., in the Provincial Assembly, and chairman of the most important committees of that body. In 1772 he was appointed with Robert Howe and Maurice Moore, to prepare a remonstrance against the appointment, by the royal governor Martin, of commissioners to fix the southern boundary of the province. Josiah Quincy, who visited him in 1773, called him "the Samuel Adams of North Carolina"; and, as the Revolution approached, he was its master spirit throughout the Cape Fear region. He was elected to the Provincial Congress in 1775, and drew up the instructions to the North Carolina delegates in the Continental Congress. When in 1776 Sir Henry Clinton appeared with a British fleet off Cape Fear, Harnett and Howe were excepted, as arch-rebels, from the terms of a general pardon. As member of the Continental Congress he signed the articles of confederation. When in 1780-1 the British held possession of the country around Cape Fear, Harnett was made prisoner, and died while a captive.

Har'ney, John Hopkins, American journalist: b. Bourbon County, Ky., 1806; d. 1867. He was educated at Oxford University, Ohio; became professor of mathematics at the University of Indiana and at Hanover College, and was president of a college at Louisville, Ky. He was for a number of years editor of the *Louisville Democrat*, a paper which took a radical attitude during the Civil War.

Harney, William Selby, American soldier: b. Haysboro, Tenn., 27 Aug. 1800; d. 9 May 1889. He entered the army in 1818; served as colonel in the Mexican War and was brevetted brigadier-general for gallantry at Cerro Gordo, and promoted to that rank in 1858. While commanding the department of Oregon, in 1859 he took possession of the island of San Juan, which was claimed by the English government. He was in consequence recalled. He retired in 1863 and was brevetted major-general in 1865.

Harney's Peak, the highest point of the Black Hills, South Dakota, named in honor of Gen. W. S. Harney; height 7,215 feet.

Haro Islands. See SAN JUAN ISLANDS.

Harold I., surnamed HAREFOOT, king of England: d. Oxford 17 March 1040. He succeeded his father Canute in 1035, notwithstanding a previous agreement that the sovereignty of England should descend to the issue of Canute by his second wife, the Norman princess Emma. Hardecane, who was about to invade England at the time of Harold's death, dug up his body and beheaded it. See Freeman, 'The Norman Conquest,' Vol. I.

Harold II., king of England, second son of Godwin, earl of Kent: b. about 1022; d. Senlac, near Hastings, Sussex, 14 Oct. 1066. On his father's death in 1053 he succeeded him in the earldom of Wessex and other great offices, and upon the death of Edward the Confessor, 5 Jan. 1066, who had named him his successor, he was chosen king by the nobles, notwithstanding the claim of Edgar Atheling, or the asserted

bequest of Edward in favor of William, duke of Normandy. The latter called upon him to resign the crown, and upon his refusal prepared for invasion. He also instigated Harold's brother, Tostig, to invade the northern coasts of England in conjunction with the king of Norway. The united fleet of these chiefs sailed up the Humber and landed a numerous body of men, who defeated the opposing forces of the Earls of Northumberland and Mercia; but at Stamford Bridge, on the river Derwent, in Yorkshire, were totally routed by Harold, whose brother Tostig fell in the battle. A day or two later he heard of the landing of the duke of Normandy at Pevensey, in Sussex. Hastening southward with all the troops he could muster, a general engagement ensued at Senlac, near Hastings, in which Harold was slain with an arrow, and the crown of England was passed to William. See SENLAC. Consult: Freeman, 'The Norman Conquest,' Vols. II. and III.; Tennyson, 'Harold' (1876).

Harold, or Harald I., surnamed HAARFAGER (Fair-haired), king of Norway, son of Halfdan the Black: d. Trondjhem 933. He succeeded to the throne in 860. While he reduced the lesser kings he left them with the title jarl, the administration of their territories, and the third part of their income; but many of them emigrated, and founded Norwegian colonies. Hrolf or Rollo emigrated to Neustria (France). Others, with their followers, established themselves in Iceland, the Shetland Isles, the Faroes, and the Orkneys, then uninhabited. When Harold found that the emigrants often extended their incursions into his dominions he embarked with a naval force to subdue them, conquered the Orkneys, etc., and returned.

Harold, or Harald III., surnamed HAARDRADA, king of Norway: d. Stamford Bridge, England, 25 Sept. 1066. The date of his birth is unknown. During a great part of his youth and prime he served in the imperial bodyguard at Byzantium, returning to Norway about 1045. He persuaded his nephew Magnus to divide the supreme power with him, in return for a share of his treasures, and two years later (1047) his nephew died, when he himself became sole king of Norway. In 1066 he joined Tostig, the brother of Harold II. (q.v.) of England, in an invasion of that country, having been promised half of it in case of success; but he was slain at the battle of Stamford Bridge.

Haroun-al-Rashid. See HARUN-AL-RASHID.

Harp, the oldest of stringed instruments. The Bible mentions Jubal as the inventor. It has been used by all nations in one form or another. The modern instrument is nearly triangular and the strings are extended from the upper part to one of the sides. It stands erect, and is played with both hands, the strings being struck or pulled with both fingers and thumbs. The improvements which have rendered the modern harp an efficient musical instrument are due to Sebastian Erard, who in 1794 took out a patent for a harp with seven pedals, and again in 1808 for a double-action harp with the same number of pedals, each of which effects two changes in the pitch of the strings. The harp thus constructed contains 43 strings tuned according to the diatonic scale, every eighth string being a replicate in another

HARP — HARPER'S FERRY

octave of the one counted from. Various improvements over Erard's harp were made during the 19th century.

Harp, or Saddleback, Seal. See SEALS.

Harp-shell, a genus (*Harpa*) of gasteropodous mollusks of the whelk family (*Buccinida*), having the last whorl of the shell large, and covered with numerous sharp smooth ribs, resembling the strings of a harp. The foot is large, and there is no operculum. These shells are elegantly marked, and much prized for their beauty. Nine species are known, all of them tropical, and living in deep water, on soft, sandy, or muddy bottoms.

Harper, Charles G., English artist and author: b. 1863. He is one of the best-known of English book illustrators, and his own books, mainly lively, entertaining descriptions of pedestrian and bicycle tours in England illustrated by himself, have been popular in the United States as well as in his own country. Among them are: 'Some English Sketching Grounds'; 'From Paddington to Penzance'; 'The Brighton Road'; 'The Great North Road'; 'The Norwich Road'; 'Cycle Rides Around London.'

Harper, Ida Husted, American journalist and author: b. Fairfield, Ind. She attended the University of Indiana for two years; entered journalism when about 18, conducted a woman's department in the *Terre Haute Saturday Evening Mail* and in the 'Firemen's Magazine,' and was a contributor to many papers, including the *Cleveland Leader*, *San Francisco Chronicle*, and *Washington Post*. She was managing editor of the *Terre Haute Daily News*, for a year, has written for the McClure syndicate, and since January 1899 has been on the editorial staff of the *New York Sun*. She was a member of the International Congress of Women in London in 1899, and was appointed chairman of the international press committee for a five years' term. She prepared the Indiana State monograph for the World's Fair at Chicago under the title 'Organized Work of Indiana Women,' and has written 'Life and Work of Susan B. Anthony' (1898) and 'History of Woman Suffrage to the Close of the Nineteenth Century' (1901).

Harper, John Murdock, Canadian educator: b. Johnstone, Renfrewshire, Scotland, 10 Feb. 1845. He was graduated from Queen's University (Kingston, Ont.), later was appointed superintendent of education for Prince Edward Island, but declined the appointment, and became successively rector of Quebec High School, and inspector of superior schools for the province of Quebec. Among his publications are textbooks and various pamphlets.

Harper, Robert Goodloe, American lawyer and statesman: b. near Fredericksburg, Va., 1765; d. Baltimore, Md., 15 Jan. 1825. In his 15th year young Harper joined a troop of horse, and under Gen. Greene served during the latter part of the southern revolutionary campaign. He was graduated from Princeton College in 1785, while there acting for a time as tutor to lower classes. Sailing from Philadelphia for Charleston, with the intention of studying law, he arrived at his destination nearly penniless, but was assisted by the father of a former pupil, who obtained a position for him in a lawyer's office. In one year he was qualified to practise, and soon established a reputation, and

became well known by a series of newspaper articles on the proposed change in the State constitution of South Carolina. He was soon after elected to the State legislature, and in 1794 to the national Congress. In this position he showed marked ability, supported the administrations of Washington and John Adams, and was regarded as one of the leaders of the Federal party. On the election of Thomas Jefferson as President in 1801 he retired from Congress, and resumed the practice of his profession in Baltimore. At the Maryland bar he attained great eminence, at the period too of its highest renown. He was associated with Joseph Hopkinson as counsel for Judge Chase of the United States Supreme Court, when under impeachment. In 1815 he was elected United States senator from Maryland.

Harper, William Rainey, American college president and Hebrew scholar: b. New Concord, Ohio, 26 July 1856; d. Chicago, Ill., 10 Jan. 1906. He was graduated at Muskingum College in 1870; was professor of Hebrew at the Baptist Union Theological Seminary, Chicago, in 1879-86; and of Semitic languages in the graduate faculty of Yale. From 1889 he was also professor of biblical literature. He was principal of the Chautauqua College of Liberal Arts in 1885-91, and in 1891 was appointed director of the Chautauqua system. In 1891 he was chosen first president of the new University of Chicago, where he was also head of the department of Semitic languages and literature. He was a founder and editor of 'Hebraica' and the 'Hebrew Student,' was an editor of three of the publications of the University of Chicago—the 'Biblical World,' the 'American Journal of Theology,' and the 'American Journal of Semitic Languages and Literature.' His administration was noted for its rapid development of the facilities of the university. Among his works are: 'Elements of Hebrew' (2d ed. 1890), 'Hebrew Method and Manual' (1885), and 'Elements of Hebrew Syntax' (1888), 'The Trend in Higher Education' (1905); 'The Priestly Element in the Old Testament' (1905).

Harper, William Saint John, American artist: b. Rhinebeck, N. Y., 8 Sept. 1851; d. 4 Nov. 1910. He studied painting at the National Academy of Design, New York, and afterward became pupil of Munkacsy and Bonnat at Paris. He did much successful work both as a painter and book illustrator.

Harper and Brothers, the designation of a noted firm of New York publishers. It consisted originally of James (1795-1869), John (1797-1875), Joseph Wesley (1801-70), and Fletcher (1806-77). The first two commenced to publish in 1818, as J. & J. Harper. The firm of Harper and Brothers, established in 1833, is now managed by descendants of the founders. It not only publishes books but 'Harper's Magazine' (monthly, since 1850), 'Harper's Weekly' (since 1857), 'Harper's Bazar' (fashions, social life, etc.; since 1867), and 'Harper's Round Table' (started in 1881 as 'Harper's Young People' and recently consolidated with 'St. Nicholas').

Harper's Ferry, W. Va., is situated in Jefferson County, 55 miles northwest of Washington, on the Baltimore & O. railroad. It is at the confluence of the Potomac and Shenandoah

sivers, where the former breaks through the Blue Ridge, presenting one of the most picturesque scenes in America. Attracted by its fine water-power, Washington, in 1796, chose it as a site for a United States arsenal and armory, and up to 1860 \$1,800,000 had been expended for land and improvements. Here 10,000 muskets were made annually, and over 75,000 small arms were usually in store. It is the seat of Storer College and of a normal school for colored pupils. Pop. (1910) 3,176.

Harper's Ferry came into great prominence in 1859 through the acts of John Brown (q.v.), and was the scene of noteworthy military events during the Civil War. When Virginia seceded, Harper's Ferry was held by Lieut. Roger Jones, with 45 men. On the night of 18 April 1861 a large body of Virginia militia, hastily assembled from the surrounding country, appeared before the place. Jones set fire to the arsenal, destroyed as much public property as possible, and retreated across the Potomac to Hagerstown, Md., and thence to Carlisle, Pa. The Virginia militia occupied the place, and troops were hastened to it from other States of the Confederacy. The Confederate government attached much importance to the place as a strategical point, but it was abandoned by Gen. J. E. Johnston, 15 June 1861, when he heard that Gen. Patterson, marching from Chambersburg, Pa., was threatening to cross the Potomac at Williamsport. The place was then occupied by the National forces. When Gen. Lee invaded Maryland early in September 1862, Harper's Ferry was held by Col. Dixon S. Miles with a large garrison, and there were strong outposts at Winchester and Martinsburg. Lee supposed that his presence at Frederick, Md., would cause the evacuation of Harper's Ferry and its outposts, and thus open his communications by way of Shenandoah Valley, but as it was still held by the National forces it became a necessity to dislodge them. On the morning of 10 September he set three columns in motion from Frederick to surround the place and capture its entire garrison. Gen. Jackson, with 14 brigades, marched rapidly over the South Mountain, crossed the Potomac at Williamsport on the 11th, drove the garrison from Martinsburg into Harper's Ferry, and appeared before Bolivar Heights on the 13th, thus investing the place from the west. Gen. McLaws, with 10 brigades, marched through Brownsville Gap, and, after a severe engagement with Col. Thomas H. Ford on the 12th and 13th, drove him from Maryland Heights and into Harper's Ferry. Gen. Walker, with his division, crossed the Potomac at Point of Rocks, 12 miles below Harper's Ferry, and on the 13th seized Loudoun Heights beyond the Shenandoah. Miles was now completely surrounded, the Confederates occupying high ground, commanding his position. Artillery fire was opened from all these points on the 14th, and late in the afternoon Jackson moved upon Bolivar Heights, drove in Miles' skirmish lines, and gained an advantageous position on the left of the Union line. During the night 1,500 Union cavalry crossed from Harper's Ferry to the Maryland side and escaped. During the same night Jackson crossed 10 guns to the right bank of the Shenandoah and established them on a plateau at the foot of Loudoun Heights, enfilading Miles' entire position on Bolivar Heights,

Early on the 15th the Confederate guns on Maryland Heights, Loudoun Heights, and in front of Bolivar Heights opened fire, which was responded to for more than an hour, but the direct and plunging flank-fire from the Confederate batteries partially silenced the Union guns and created some disorder in the Union ranks. Jackson had advanced his lines to within 150 yards of the Union works on Bolivar Heights, and was about to assault, when Miles ordered a white flag displayed on his works and directed Gen. Julius White to arrange terms of capitulation, soon after which Miles was mortally wounded by a shell from a battery that had not seen the white flag. The Union loss during the siege was 44 killed and 173 wounded, and the number of prisoners surrendered and paroled 12,520. The Confederates captured 70 guns, 13,000 small arms, 200 wagons, and a large amount of quartermaster and commissary stores. The Confederate loss was 41 killed and 247 wounded, the greater part of whom were lost in the engagement on Maryland Heights. The Confederates abandoned Harper's Ferry on the 20th, and it was again occupied by the Union forces on the 22d. Consult: 'Official Records,' Vols. II. and XIX.; Allan, 'Army of Northern Virginia in 1862'; 'The Century Company's 'Battles and Leaders of the Civil War,' Vols. I. and II.

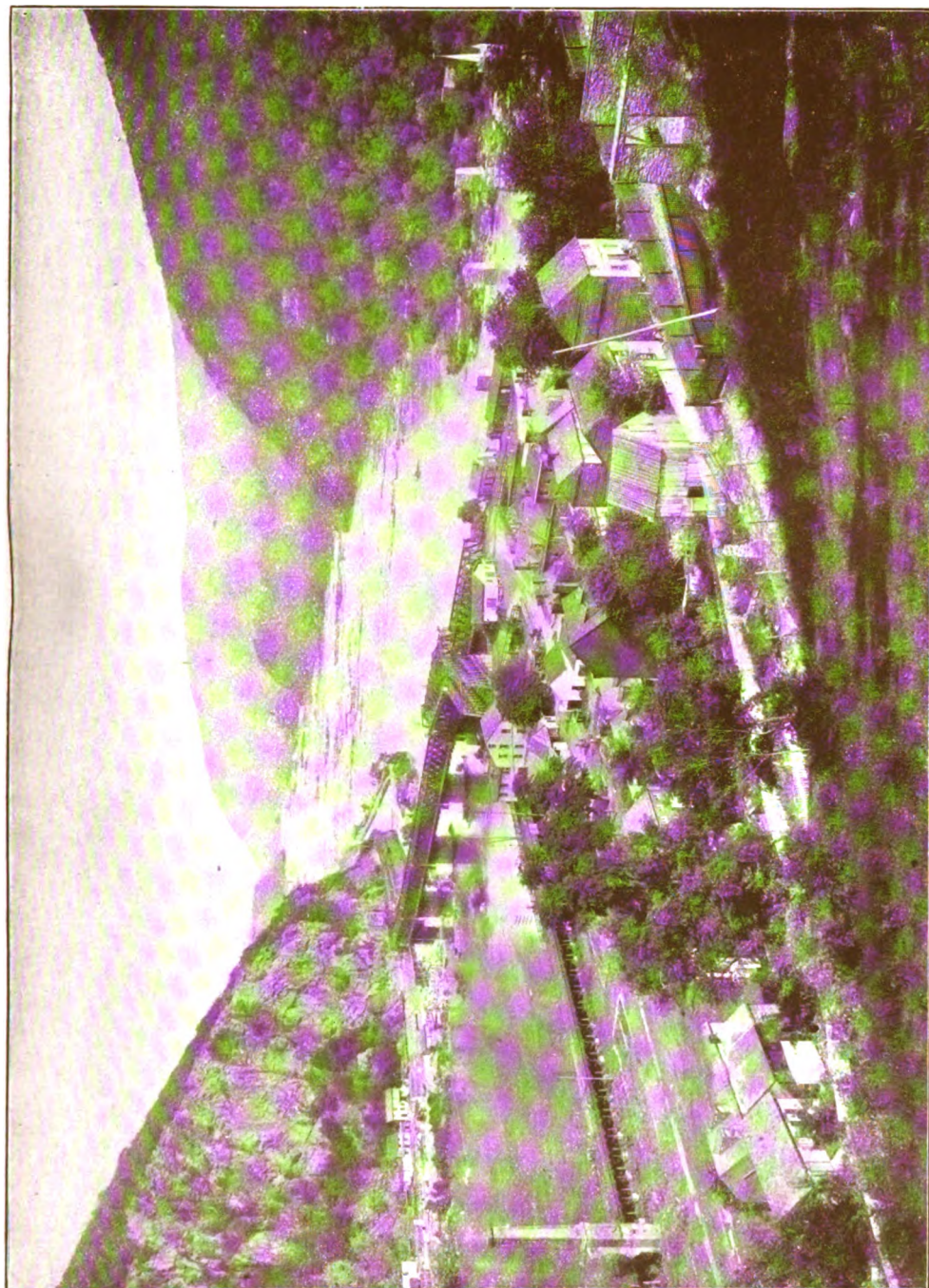
E. A. CARMAN.

Har'pies (Greek, *Harpuiai*, swift robbers), the goddesses of storms. Their ages, appearance, names and number are so differently given by the poets that it is difficult to say anything definite concerning them. In the Homeric poems they are represented as personified storm-winds. The later poets and artists vied with each other in depicting them under the most hideous forms. One has given them the head of a fowl, with wings and a body covered with feathers, human arms with claws, a white breast, and human legs which terminate in the feet of a fowl. Others have given them the face of a young woman with the ears of a bear. See FURIES.

Harpignies, Henri Joseph, ön-rë zhō-zěf är-pën-yë, French landscapist: b. Valenciennes 28 July 1819. He studied at Paris with Achard, first exhibited at the salon of 1853, and in 1861 attracted attention by his 'Edge of a Wood beside the Allier.' His landscapes, done with equal success in oils or water-colors, evince a skilfulness of drawing and a coloristic truthfulness marred only occasionally by a harshness in matters of technique. His works number: 'View of Capri,' 'Le Saut du Loup,' 'Banks of the Rhone' (Metropolitan Museum, N. Y.), and 'Garden of the Villa Medici.'

Harp'sichord, a stringed instrument formerly in use, in appearance and construction similar to a grand pianoforte. In the front the keys were disposed, the long ones being the naturals, and the short ones the sharps and flats. This instrument, called by the Italians *clavicembalo*, by the French *clavessin*, was an improvement upon the clavichord, which was borrowed from the harp. Both are now superseded by the pianoforte. See PIANOFORTE.

Harp'swell, Maine, a township including the post village of Harpswell Centre, and comprising a peninsula and some islands in Casco Bay, 14 miles east of Portland. It has agricul-



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tural interests and grist-mills, but is chiefly noted as a summer resort. Pop. (1910) 1,650.

Harpy-eagle. See **EAGLE**.

Har'raden, Beatrice, English novelist: b. Hampstead, London, 24 Jan. 1864. She took her degree at London University at 21, and subsequently traveled extensively in the United States and on the Continent. Her first novel, 'Ships that Pass in the Night' (1893), was instantly successful and was widely circulated. It has been followed by 'In Varying Moods' (1894); 'Hilda Strafford,' a Californian story (1897); 'The Fowler' (1899).

Harrier, a small mottled hound used in Europe in ancient times, and up to the end of the 18th century for chasing hares, the sportsmen following on foot. The old breed has disappeared except a few bred for show purposes by fanciers; its place being taken in sport by a small kind of foxhound followed on horseback.

Harrier. See **MARSH-HAWK**.

Har'igan, Edward, American actor and playwright. b. New York 1845; d. New York, 6 June 1911. He entered upon the stage as a variety performer and was a partner of Tony Hart (1871-85), when they opened in New York their first Theatre Comique (1876). Among his dramas, which are strong in character drawing, but of little value in a literary sense, are: 'Squatter Sovereignty'; 'Cordelia's Aspirations'; and 'Reilly and the Four Hundred.'

Harrild, Robert, English inventor: b. London 1780; d. 1853. He was the inventor and manufacturer of composition rollers for inking type, the introduction of which alone rendered cylinder presses practicable. He began the manufacture of printers' materials in London in 1809 and the printing-press with which Franklin worked in London was owned by him before it was brought to the United States in 1841 and put into the Patent Office at Washington, where it now stands.

Har'riman, Tenn., city in Roane County; on the Emory River, the Southern, the Tennessee C., and the Queen & C. R.R.'s; about 78 miles northeast of Chattanooga, and 37 miles west of Knoxville. It was founded in 1890 and received its city charter in 1891. The charter was revised in 1899. It is situated in an agricultural region which contains rich deposits of coal and of iron ore, and some timber land. Its chief manufactures are foundry and machine shop products, leather, farm implements, iron, flour, lumber, cotton goods, and furniture. It is the seat of an industrial school for colored children, and of the American University, established in 1893. Its trade in agricultural and mining products and in its own manufactured articles is rapidly increasing. The waterworks and electric-light plant are owned and operated by the city. Pop. (1910) 3,061.

Harriman Alaska Expedition, an American scientific and artistic expedition which visited the southern coast of Alaska during the summer of 1899. The party was organized by Edward H. Harriman, and consisted of the members of his own family, a few friends, and 50 gentlemen interested in science, art and literature. Among them were Messrs. Henry Gannett, W. H. Dall, C. H. Merriam, R. Ridgway, G. K. Gilbert and F. V. Calville of Washington; D. G. Elliot of

Chicago; William Trelease of St. Louis; John Muir and W. E. Ritter of California, and several professors from Eastern institutions of learning. Messrs. John Burroughs, Swain Gifford and F. S. Dellenbaugh represented the literary and artistic contingent. These gentlemen made good use of their opportunities in investigating the geography, geology, glacial phenomena, and fauna and flora of the region visited.

The results so far as announced (1904) are over 300 species and sub-species of animals and plants, records of observations of 22 "living" glaciers, those which discharge icebergs directly into the sea, and of 100 "dead" glaciers, those whose fronts do not reach the sea. A new chart was made of the part of the coast explored. (See **HARRIMAN FIORD**.) Some of the new animal species found are two of foxes, five species and sub-species of shrews, five of hares, one crab, a shrimp, and 25 sea-worms. One of the sea-worms is about six feet long and of a deep vermilion color; another about the same size is blood-red with a white head. In no other part of the world have been found sea-worms of such varied and striking forms and colors. Among the plants found were a large number of new species and sub-species. Each department of science was represented by one or more experts who made critical observations and accurate reports. Consult: 'Reports of the Harriman Alaska Expedition'; 'The World's Work' (1900); 'Discoveries in our Arctic Region.'

Harriman Fiord, on the southern coast of Alaska, at about lat. 61° N. and lon. 145° W., is an arm of Prince William Sound, 15 miles in length. This fiord was discovered by the Harriman Alaska Expedition (q.v.), in 1899. The finding of this fiord is described by John Burroughs, a member of the Expedition, as follows: "Later in the afternoon we ascended an arm of Port Wells more to the westward and entered upon a voyage of discovery. We steamed up to a glacier of prodigious size that reared its front across the head of the inlet and barred further progress in that direction—the Barry Glacier. According to the United States Coast Survey map we were at the end of navigation in these waters; but we went on under a good head of steam down this new inlet where no ship had ever before passed. Glaciers hung on the steep mountain sides all about us. One of these was self-named the Serpentine by reason of its winding course down from its hidden sources in the mountains—a great white serpent with its jaws set with glittering fangs at the sea. Another was self-named the Stairway, as it came down in regular terraces or benches. As we neared the front of this glacier the mountains to the left again parted and opened another new arm of the sea, with more glaciers tumbling in mute sublimity from the heights, or rearing colossal palisades across our front. Another ten-mile course brought us to the head of this inlet, which was indeed the end of navigation in this direction. Subsequently this inlet was fitly named the Harriman Fiord, and the glacier at the head of it, Harriman Glacier."

Har'rington, Mark Walrod, American astronomer: b. in Sycamore, Ill., 18 Aug. 1848. He was educated at the University of Michigan, and in 1870-1 assisted in the United States Coast and Geodetic Survey of Alaska. He was

professor of astronomy and director of the observatory at the University of Michigan, 1870-91. In 1884 he established the 'American Meteorological Journal' and was its managing editor until 1892. In 1891 he became chief of the Weather Bureau at Washington, D. C., which post he held till 1895, and was president of the Washington State University 1895-7.

Harriot, Thomas, English mathematician: b. Oxford 1560; d. London 2 July 1621. He entered Saint Mary's Hall, Oxford, and was graduated in 1580. In 1585 he was sent by Sir Walter Raleigh as surveyor on the Grenville expedition to Virginia, and on his return he published an account of Virginia, later printed in Halluyt's 'Voyages.' He gained the favor of the Earl of Northumberland, who gave him an annual pension, and thereafter devoted himself entirely to mathematical and scientific research. His chief work, 'Artis Analyticae Praxis ad Equationes Algebraicas Resolvendas,' published in 1631, embodied the most important results of his mathematical work. He practically gave to algebra its modern form, improving the notation, being the first to equate all the terms of an equation to zero, and announcing the principle that every equation has as many roots as its dimension. He also did important work in astronomy. See ALGEBRA, HISTORY OF THE ELEMENTS OF.

Har'ris, Amanda Bartlett, American writer: b. Warner, N. H., 15 Aug. 1824. She is a popular writer for young people and has published: 'How We Went Bird-Nesting' (1880); 'Wild Flowers, and Where They Grow' (1882); 'American Authors for Young Folks' (1887); 'The Luck of Edenhall' (1888); etc.

Harris, George, American college president: b. East Machias, Maine, 1844. He was graduated at Amherst, 1883; and at Andover Theological Seminary 1869. After taking several pastoral charges he became professor of Christian theology at Andover 1883, from which position he passed in 1899 to the presidency of Amherst, which he now holds. He was one of the editors of the 'Andover Review,' 1884-93. Among his works are 'Moral Evolution' (1896); 'Inequality and Progress' (1897).

Harris, James Rendel, English scholar. He was graduated at Cambridge University, where he was fellow and librarian of Clare College. He was professor at Johns Hopkins University and at Haverford College, and is now university lecturer in palaeography at Cambridge, England. He has written many volumes on philology and palaeography, among them being 'Annotators of the Codex Bezae' (1901).

Harris, Joel Chandler, American journalist and author: b. Eatonton, Ga., 8 Dec. 1848; d. Atlanta, Ga., 3 July 1908. He began his career as a printer's apprentice on the Forsyth (Ga.) *Countryman* and was on the staff of the *Savannah Daily News*, 1871-6. He was connected with the *Atlanta Constitution* for 25 years. The series of "Uncle Remus" sketches and songs which gave him an international reputation were first printed in the *Constitution*. His published books include: 'The Folk-Lore of the Old Plantation' (1880); 'Nights With Uncle Remus' (1883); 'Mingo and Other Sketches'

(1883); 'Daddy Jake, the Runaway' (1889); 'Free Joe and Other Stories' (1887); 'Balaam and his Master' (1890); 'Mr. Rabbit at Home' (1895); 'The Story of Aaron' (1896); 'Stories of Georgia History' (1897); 'Sister Jane,' a novel (1897); 'Minervy Ann' (1899); 'On the Wing of Occasion' (1900); 'The Making of a Statesman'; 'A Little Union Scout'; 'Told By Uncle Remus' (1905); 'Uncle Remus and Br'er Rabbit' (1907); etc.

Harris, Joseph, American agricultural writer: b. Shrewsbury, England, 1828; d. 1892. He began his scientific study of agriculture with Lawes and Gilbert at Rothamsted and in 1861 emigrated to the United States. His 'Walks and Talks on the Farm' appeared partly in the 'Genesee Farmer,' and partly in the 'American Agriculturalist.' Among his other writings are: 'Harris on the Pig' (1888); and 'Talks on Manures' (1883).

Harris, Miriam Coles, American novelist: b. Dosoris, L. I., 7 July 1834. She was married to Sidney S. Harris in 1864 and has since lived in New York. She wrote: 'Rutledge' (1860); 'The Sutherlands' (1862), both widely read, and among many later and almost equally popular works of hers are: 'A Perfect Adonis' (1875); 'Missy' (1800); and 'An Utter Failure' (1891).

Harris, Samuel, American theologian: b. East Machias, Maine, 14 June 1814; d. Litchfield, Conn., 25 June 1899. He was graduated from Bowdoin College and from Andover Theological Seminary. He was a teacher for a time and held Congregationalist pastorates in Conway, Mass., 1841-51. In 1855 he was appointed professor of systematic theology in Bangor Seminary; was president of Bowdoin 1867-71; and then became professor of systematic theology in the Yale Divinity School. His writings include: 'Zaccheus or the Scriptural Plan of Benevolence'; 'Kingdom of Christ on Earth' (1874); 'Philosophical Basis of Theism' (1883); 'Self-Revelation of God' (1887); 'God, Creator and Lord of All' (1897).

Harris, Thaddeus William, American naturalist: b. Dorchester, Mass., 12 Nov. 1795; d. Cambridge, Mass., 16 Jan. 1856. He was graduated at Harvard College in 1815, studied medicine and practised his profession in Milton, Mass., until appointed librarian of Harvard in 1831. This position he occupied until his death. Early in life he exhibited a fondness for natural history, and though plodding alone, attained to a scientific eminence which secured for him the fellowship of all the principal learned societies of America, and of many abroad. For several years he gave instruction in botany and general natural history in the college, and originated the Harvard natural history society for the students. He was chiefly distinguished, however, as an entomologist, and has been surpassed as such by no one in the United States. He was one of the founders of the Massachusetts Horticultural Society. In 1837 he was appointed one of the commissioners for a zoological and botanical survey of Massachusetts, the result of which was his 'Systematic Catalogue of the Insects of Massachusetts' (1832), in which 2,350 species are enumerated. He also published: 'A Treatise on some of the Insects of New England which are Injurious to Vegetation' (1842), a work of permanent value.

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Harris, Thomas Lake, American socialistic and religious reformer: b. Fenny Stratford, England, 15 May 1823. He accompanied his father to the United States in childhood, was for a time a Universalist pastor, and founded an 'Independent Christian Society' in 1850; but became a lecturer upon spiritualism. He lectured abroad in 1858, and on his return to the United States organized the society of the "Brotherhood of the New Life." This was established at Wassaic, Dutchess County, N. Y., 1861-7, but removed to Brocton, Chautauqua County, N. Y., in the last named year. Its nature was co-operative rather than communistic, and farming and industrial occupations were engaged in by his followers, numbering at one time about 2,000 in the United States and Great Britain, among them Lady Oliphant and her son, the well-known writer, Laurence Oliphant (q.v.). Harris removed to California in 1887, and retired to private life in 1895, residing in New York city. He published many works in prose and poetry, among which are 'Wisdom of Angels' (1856); 'Arcana of Christianity' (1857); 'Modern Spiritualism' (1860); 'God's Breath in Man' (1891).

Harris, Townsend, American merchant and diplomatist, of Welsh descent and of Revolutionary stock, the youngest of five children: b. Sandy Hill, N. Y., 4 Oct. 1804; d. New York city 25 Feb. 1878. He received his education at the village school and academy. From 1817 to 1848 he was in business in New York city, continuing his self-culture by continuous and critical reading of the best literature, learning also the French, Spanish, and Italian languages; was member of the Board of Education and in 1846-7 its president. He was the practical founder of the New York Free Academy, now the College of the City of New York, and in many ways was a typically useful citizen. He never married. In 1848 he went to California and during the following six years made trading voyages to China and the Dutch and English Indies, becoming thoroughly acquainted with the manifold Oriental varieties of human nature. He acted for a time as American vice-consul at Ningpo. He was appointed Consul General to Japan and on the U. S. S. San Jacinto arrived at Shimoda, his future dwelling place (and now noted for its stone quarries), where the flag of the United States was hoisted 4 Sept. 1856. From the first Mr. Harris spoke the truth as against the constant deceit and prevarication of the corrupt officials of the Yedo Shogunate, demanding the courtesies due to an accredited envoy of a civilized power and refusing to deliver the President's letter to any one but the Shogun in Yedo and to him personally. Unbacked by a single ship or man, and with his secretary only, after prolonged negotiations lasting 18 months, he made a triumphal progress to Yedo, and standing erect received personal audience of the Shogun in the palace. Then began four months' instruction of these political hermits in the methods of modern international law and procedure. He concluded the treaty and received the promise of signature by the premier, without regard to anything happening in China. Nevertheless the arrival of Commodore Tatnall with two American men-of-war, bringing news of the humiliation of the Chinese emperor and

court, undoubtedly had its influence on the Japanese. Mr. Harris urged the importance of having the treaty signed without a moment's delay, and the premier Li despatched commissioners to affix their signatures and soon after an embassy to the United States, for which reason chiefly, Li was assassinated in Yedo, 23 March 1860. The Harris treaty secured the right of trade, residence, and of missionary operations and teachings. He was buried in Greenwood cemetery, Brooklyn, N. Y. Mr. Harris has always been very highly thought of by the Japanese, and is still the subject of much praise and appreciative writing by Japanese writers. His journals with comment and biography were published in 1896.

WILLIAM ELLIOT GRIFFIS,

Author of 'Townsend Harris, First American Envoy in Japan.'

Harris, William Torrey, American educator and metaphysician: b. North Killingly, Conn., 10 Sept. 1835; d. Providence, R. I., 5 Nov. 1909. He studied at Yale in the class of 1858, and after teaching in the St. Louis public schools, 1857-67, was superintendent of the schools of that city 1867-80. While in St. Louis he founded in 1867 the 'Journal of Speculative Philosophy.' He removed to Concord, Mass., in 1880 and aided in founding the Concord School of Philosophy at which he lectured on metaphysical themes. From 1889 to 1906 he was United States Commissioner of Education. He has edited Appleton's School Reader and Appleton's Educational Series and is the author of 'Hegel's Logic: a Critical Exposition' (1890); 'The Spiritual Sense of Dante's Divina Commedia' (1891); 'Introduction to the Study of Philosophy'; 'Psychologic Foundations of Education.'

Harrisburg, Pa., city, State capital; county-seat of Dauphin County, on the Susquehanna River, the Pennsylvania canal, and on the Northern Cent.; Pennsylvania; Cumberland Valley, and Philadelphia & R. R.R.'s, and is situated 105 miles northwest of Philadelphia. This is an important railroad, agricultural, industrial and commercial centre, and is the home of a system of municipal reform known as "the Harrisburg Plan" which has attracted widespread attention throughout the United States. The Susquehanna River is nearly a mile in width at this point, and is crossed by numerous bridges.

History.—The site of the future city was selected by John Harris in 1785, and the settlement was incorporated as a borough in 1791. Harris was an adventurous English trader who built the first house here in 1726, and secured a grant of 800 acres. His son established a ferry here in 1753, and the place was known for many years as Harris Ferry. The town became the capital of the state in 1812, and was chartered as a city in 1860. The Harrisburg convention (q.v.), famous in American political history was held here in 1828, and Harrison and Tyler were nominated here in 1839.

Topography.—The city has a most picturesque location on the left bank of the Susquehanna, which is spanned here by five bridges, three of

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them modern steel structures. The old historic "Camel-back Bridge," a part of which was burned during the middle of the 19th century, has been entirely removed. There is an extensive and beautiful park of 16 acres, well-made streets, an abundance of shade, and a fine sewage system with natural drainage.

Commerce and Industry.—The iron, steel, lumber and railroad interests of Harrisburg are of great importance. The roundhouses and repair shops of the Pennsylvania Railroad are located here and give employment to thousands of workmen. There are extensive manufactories of machinery, malt liquors, boilers, castings, brooms, cars, coaches, tanned leather, lumber, cotton goods, beds, mattresses, coffins, silk goods and a large number of rolling-mills, tin-mills, blast furnaces, nail-works, typewriter works and boot and shoe factories. The city has two morning and two evening newspapers and many weekly and monthly publications.

Public Buildings.—Prominent among the public buildings is the new State capitol, erected at a cost exceeding \$4,000,000. It is built of brick and steel, with facings of marble and granite. At the main entrance is a fountain 78 feet wide, from which the water leaps down an incline in many cascades. On each side of the fountain rises a granite stairway 48 feet wide, broadening at the top into an esplanade and widening at the corners of the building to the proportions of a reviewing ground for troops. The lesser approaches to the grounds are ornamented with statues of the animals native to Pennsylvania. The State Library here, founded in 1790, contains over 100,000 volumes. In State Street stands the Dauphin County soldiers' monument, 110 feet high, in memory of the soldiers who died in the Civil War. There is also a statue here of Gen. John F. Hartranft, and a monument erected to the memory of the soldiers who fell in the Mexican War adorns the Capitol Park. Among other points of interest are the State Arsenal, the court-house, lunatic asylum, executive building, post-office, Harris Park, and Harrisburg Cemetery. The educational institutions include the high school, Harrisburg academy, St. Genevieve's academy, and the Young Ladies' Seminary. Harrisburg is the seat of a Roman Catholic bishop, and its charitable organizations include several hospitals, the Home of the Friendless, and the Children's Industrial Home.

Transportation.—Harrisburg has in operation one of the most extensive and perfect electric street railway systems in the United States. Every part of the city, and suburbs, and the neighboring towns and city are reached by electric trolley lines. The suburban railway service of the Pennsylvania and other railroads is unusually advantageous in extending the outlying residential sections of the city.

Municipal Administration.—The city government is vested in a mayor, elected every three years, with no second term, and a bicameral and select council. The highway commissioner, police officials, building inspector, fire department and sanitary officers are selected by the select council. The city solicitor, board of tax revision and appeals, water commissioners, city engineer, city clerk, 3 members of the board of public works and 5 members of the board of park commissioners, are selected by the common

council. The treasurer, controller, school directors, supervisors and assessors are elected by vote of the citizens.

Banks and Finance.—Harrisburg has four national banks and a dozen other banking institutions and building and loan associations. The assessed real estate (1910) is \$46,057,120, the tax rate of course constantly changing. The municipal income amounts to \$600,000 and the expenditure to \$530,000. The principal items of expense are: Fire department, \$15,000; water-works, \$30,000; street lighting, \$30,000; police, \$35,000; schools, \$185,000. Public improvements involving an expenditure of \$1,000,000 were begun in 1902, for the development of a new sewer system, water filtration, park development and street paving.

Municipal Reform.—Harrisburg through the progressiveness and enterprise of her citizens in the municipal improvement of the city, has been called "the model city," and the plans of 1902, for an expenditure of \$1,000,000 have created an improvement system now known as "the Harrisburg plan." In May 1901, a citizen wrote a letter to a daily paper offering \$100 toward a fund of \$5,000 to engage expert engineers to examine the city and to report a plan of improvement. The proposal met instant approval. In a few weeks the \$5,000 was pledged by 60 citizens. An organization and an executive committee soon followed, and these included the mayor, civil engineer and other officials elected by a reform element in local politics. Three noted engineers were employed, and their reports published in October 1901, included plans and estimates for the immediate improvement of the city. The subject was presented to the people at the annual election, 18 Feb. 1902. "The Harrisburg League for Municipal Improvements" carried on an aggressive campaign, proposing a million dollar expenditure. Objections were raised and to overcome these a board of public works was formed (under the laws of the State), composed of citizens who would serve without pay, and to have entire control of the improvements. An ordinance authorizing this board and providing for its appointment before the election was passed by councils immediately after an ordinance had been passed submitting to the voters the question of increasing the city's debt for the following purposes:

"The sum of \$310,000 for the extension, improvement and filtration of the water supply; \$365,000 for the extension and improvement of the sewerage system; \$65,000 for the construction of a dam in the Susquehanna River to form part of the improved sewerage system; \$250,000 for acquiring land and property for parks and for making park improvements; and \$100,000 for the creation of a fund out of which the city may defray the cost of paving the intersections of streets hereafter authorized to be paved."

Upon this board three leading citizens of high character were appointed, the campaign was opened, the newspapers supported the movement, and even the women formed a civic league and aided in the work. Pamphlets, maps and diagrams were issued and a booklet, "The Plain Truth About the Proposed Improvements for Harrisburg," was widely circulated. The result of the election was a casting aside of party lines, and out of a total of 11,048 ballots, the "improvement" party had a majority of 3,590 votes. It

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was a mixed ticket selected for reform that won the election, the mayor being a Democrat (in a city naturally Republican), the treasurer, also a Democrat, while the controller was a Republican. Of the six candidates for the board of assessors, an important body, fixing the tax valuation of the city, the best three (two Republicans and one Democrat) were selected. Harrisburg in 1904 with her \$1,000,000 improvements well advanced, is on the high road to remarkable prosperity. The State construction of a capitol building costing over \$4,000,000, and the local railroads projecting improvements involving the expenditure of several millions, add additional strength to the movement toward municipal reform. Pop. (1900) 50,167; (1910) 64,186.

Harrisburg Convention, the assembly convened in 1828 at Harrisburg, Pa., by the protectionist faction of the New England and Middle States, consequent on the rejection of the high tariff "Woolen Bill" in the Senate, by the casting-vote of the Vice-President. The forcible presentation of the cause of protection, and the demands of the convention for an increased duty on several manufactured articles, resulted in the passage of the high tariff bill of 1828.

Harrison, Benjamin, American statesman: b. Berkeley, Va., about 1740; d. April 1791. While a very young man he was elected to the House of Burgesses of which he was twice Speaker, and in 1773 was chosen a member of the committee which united the colonies against Great Britain. He was a member of the Continental Congress, 1774-7, and on 4 July 1776, reported, as chairman of the committee of the whole House, the Declaration of Independence, of which he was one of the signers. He was opposed to the ratification of the Federal constitution, but after its adoption, supported the national government. His brother, Charles, was a noted general in the American army during the Revolution, and his son, William Henry, became ninth President of the United States.

Harrison, Benjamin, 23d President of the United States: b. North Bend, Ohio, 20 Aug. 1833; d. Indianapolis, Ind., 13 March 1901. He was a great-grandson of Benjamin Harrison, signer of the Declaration of Independence (q.v.), and grandson of William Henry Harrison, ninth President (q.v.) He was graduated from Miami University (Oxford, Ohio) in 1852, studied law in Cincinnati, was admitted to the bar in 1853, and in 1854 began in Indianapolis the practice of his profession. In 1860 he was elected reporter of the supreme court of the State. At the time of his election to the Presidency (1888) he was one of the foremost leaders of the State bar. At the outbreak of the Civil War he assisted in recruiting the 70th regiment of Indiana Volunteers, of which he became colonel (August 1862). He was an exceedingly efficient commander. For some time he was detailed to guard railways in the West; and in the campaign from Chattanooga to Atlanta the regiment was in the 20th Army Corps, the commander of which was Gen. Joseph Hooker. Harrison commanded a brigade at Peach Tree Creek, where he served with especial distinction, and also at Nashville. He was present at Johnston's surrender at Durham Station, N. C., in 1865, was brevetted brigadier-general for his

services in command of the brigade, and in June of that year was mustered out. The supreme court of Indiana had declared that Harrison by his enlistment vacated his office of reporter, and a Democrat was elected by default to fill that office for the unexpired term. At the election of 1864 Harrison, while still in the field, was re-chosen. In 1867 he refused a renomination, and recommenced his legal practice, in which he was largely retained in both the Federal and State courts. In 1876 he became, on the retirement of the original candidate, the Republican candidate for the governorship, and though he ran about 2,000 votes ahead of his ticket, he was defeated by a Democratic plurality of 3,000. He was appointed a member of the Mississippi River commission in 1879, and in 1880 was chairman of the Indiana delegation in the Republican national convention. At that convention, where he cast nearly the entire vote of the State for Garfield, he was himself mentioned in connection with the Presidency. From 1881 to 1887 he was in the United States Senate, in which he took rank as a prominent debater. He opposed Cleveland's vetoes of the pension bills, urged increase in the navy and civil-service reform, and as chairman of the committee on territories demanded the admission as States of North and South Dakota, Montana, Washington, and Idaho. In 1884 he was a delegate to the Republican national convention. At the convention of 1888 (Chicago, Ill.) he was presented by the solid Indiana delegation as a candidate for the nomination to the Presidency; and on the eighth ballot he received the nomination by a vote of 544. The campaign was a vigorous one, and Harrison made many excellent speeches. He was elected, receiving in the electoral college 233 ballots to 168 for Grover Cleveland. His administration was broadly characterized by a firm defence of American interests in foreign affairs and a general promotion of industry and governmental effectiveness. During this time the 55th Congress passed the tariff act known as the McKinley law; the reciprocity system was introduced; the new navy was extended; civil-service reform was promoted; and the Pan-American congress with representatives from all Central and South American countries was held at Washington in the winter of 1889-90. The Bering Sea arbitration respecting the seal fisheries was also organized between Great Britain and the United States. The Samoan difficulties were adjusted; and the Chile affair, concerned with an attack on American sailors either connived at or permitted by Chilean authorities, was promptly and satisfactorily settled by enforced reparation on the part of Chile. At the Minneapolis convention of 1892 Harrison was renominated without serious opposition. He was a second time opposed by Cleveland, and his defeat by 276 electoral votes to 145 was an occasion for some surprise. Upon his retirement from office, he returned to the practice of law, and in 1893-4 delivered a course of lectures on constitutional law at Stanford University. In 1899 he appeared as counsel for Venezuela in the Anglo-Venezuelan boundary arbitration commission. He was appointed a member for the United States of the Peace Conference held at The Hague in 1899, and became one of the International Board of Arbitration. He wrote 'Thir-

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Country of Ours (1897). A complete collection of his public addresses from 1888 to 1892 was edited by Hedges (1892). A posthumous collection of articles, 'Views of an Ex-President,' was published in 1901. Consult the campaign life by Lew Wallace (1888), and Wilson (editor), 'The Presidents of the United States' (1894). GEORGE EDWIN RINES,
Editorial Staff, 'Encyclopedia Americana.'

Harrison, Burton Norville, American lawyer: b. New Orleans 1836; d. Washington, D. C., 29 March 1904. He was graduated from Yale in 1859, shortly afterward became professor of mathematics and astronomy in the University of Mississippi, and at the outbreak of the Civil War was appointed private secretary to Jefferson Davis, president of the Confederate States. Captured with Davis, he remained in imprisonment until January 1866, when his release was effected by the intervention of F. P. Blair and President Johnson. Subsequent to the war he followed the law in the north with much success.

Harrison, Mrs. Burton. See HARRISON, CONSTANCE CARY.

Harrison, Carter Henry, American politician: b. Elk Hill, Fayette County, Ky., 15 Feb. 1825; d. Chicago 28 Oct. 1893. He was graduated from Yale in 1845, from the Transylvania University law school (Lexington, Ky.), in 1855, and in the latter year was also admitted to the bar and removed to Chicago. There he invested in real estate, in 1869 was defeated as a candidate for State senator on the Democratic ticket, but in 1871 was elected county commissioner of Cook County, and in 1874 was sent to Congress from the 2d Illinois district, and in 1876 re-elected. In 1879 he was elected mayor of Chicago, and again in 1881, 1883, 1885, and 1893. He was also an unsuccessful independent candidate in 1891. In 1891 he purchased the *Chicago Times*, in the direction of which he was active until his election as mayor in 1893. In several instances his mayoralty contests assumed national interest, particularly so that of 1893—the 'World's Fair year'—when the success of the great exposition was thought to depend much upon the occupant of the mayor's chair. He was opposed by the united Citizens' and Republican forces and by nearly the entire press of Chicago, but after a vigorous campaign of public meetings was elected by more than 21,000 majority. He wrote: 'A Race with the Sun'; and 'A Summer Outing.'

Harrison, Carter Henry, American politician: b. Chicago 23 April 1860. He is son of the preceding. He graduated from St. Ignatius College, Chicago, in 1881, and from the Yale Law School in 1884. He practised law in Chicago, was later engaged in the real estate business, and in 1891 became editor of the *Chicago Times*, a position which he held for two years. He has been active in Chicago politics as a Democrat, and has been four times elected mayor of the city, in 1897, 1899, 1901, and 1903.

Harrison, Constance Cary, American novelist and miscellaneous writer: b. Vaucluse, Va., 25 April 1846. She was married in 1867 to Burton N. Harrison (q.v.) and has since lived in New York. She is one of the most popular of American authors and among her published books are: 'Woman's Handiwork in Modern

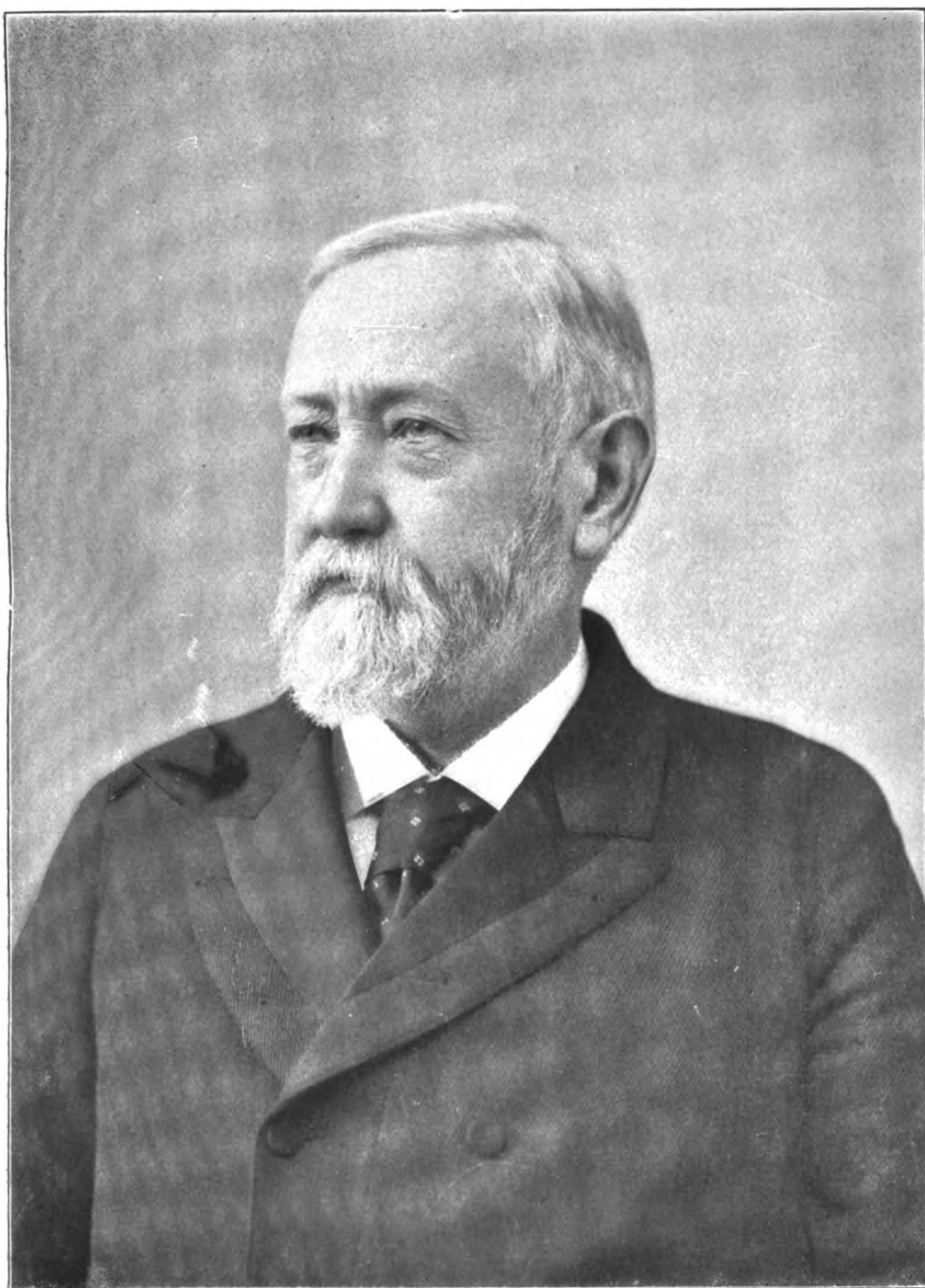
Homes' (1881); 'Old-Fashioned Fairy-Book' (1884); 'Bar Harbor Days' (1887); 'The Anglomaniacs' (1887); 'Sweet Bells Out of Tune' (1893); 'An Errant Wooing' (1895); 'A Bachelor Maid' (1894); 'A Son of the Old Dominion' (1897); 'A Merry Maid of Arcady' (1897); 'Good Americans' (1898); 'A Princess of the Hills' (1901); a play, 'The Unwelcome Mrs. Hatch' (1901); etc.

Harrison, Frederic, English philosopher and historian: b. London 18 Oct. 1831. He was educated at Oxford; was called to the bar at Lincoln's Inn in 1858, and for a time practised as a conveyancing and equity lawyer. In 1877 he was appointed professor of jurisprudence and international law at the Inns of Court, a post which he held till 1889. He is the chief living representative in England of Positivism and the Religion of Humanity. He has been widely read in the United States, which he visited on a lecturing tour in 1901. He is a master of English style and his literary judgments command the fullest respect. Among his publications 'The Meaning of History' (1862); 'Science and Humanity' (1879); 'The Present and the Future' (1880); 'Byzantine History in the Early Middle Ages' (1900), his Rede Lecture. The volume entitled 'The Religious Systems of the World' (1893) includes an account by him of the Religion of Humanity.

Harrison, Gabriel, American author and artist: b. Philadelphia 25 March 1825; d. Brooklyn, N. Y., 15 Dec. 1902. He began life as a photographer and an actor and in 1845 supported Charles Keane at the Park Theatre, New York, and later taught elocution, and wrote dramatic and art criticism. Among his works are: 'Life of John Howard Payne' (1873); dramatization of 'The Scarlet Letter' (1878); etc.

Harrison, James Albert, American philologist: b. Pass Christian, Miss., 21 Aug. 1848. He was graduated at the University of Pennsylvania in 1868; and has since been professor of Latin and modern languages at Randolph-Macon College, Va., 1871-6; of English and modern languages at Washington and Lee University 1876-95, and of English and romance languages at the University of Virginia. He is a prominent member of the American Philological Association and the founder and editor of the 'Library of Anglo-Saxon Poetry.' Among his works are: 'Group of Poets and Their Haunts' (1881); 'Story of Greece' (1885); 'Dictionary of Anglo-Saxon Poetry' with Baskerville (1886); etc.

Harrison, Joseph, American engineer: b. Philadelphia 20 Sept. 1810; d. there 27 March 1874. In 1834 he began the construction of locomotives, and in 1840 designed for the Reading railway an engine which was copied and introduced into Russia with such success that he was invited to Russia, and there with two other American engineers concluded a contract with the Russian government to build the rolling-stock and locomotives of the St. Petersburg and Moscow railway. He executed also other important contracts with that government, and in 1852 returned to the United States, where he subsequently patented a safety-boiler and received both the gold and silver Rumford medals from the American Academy of Arts and Sciences. In 1869 he published a folio containing his autobiography, incidents of his Russian ex-



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perience, and his poem, 'The Ironworker and King Solomon.'

Harrison, Lovell Berge, American artist; b. Philadelphia 28 Oct. 1854. He studied with Alexander Cabanel in Paris, became known for his landscapes, especially snow-scenes, and obtained medals at the Paris Salon of 1887 and the Columbian Exposition (1893). His works include: 'Friends, or Foes?'; 'A Waif from the Sea'; 'Calling Home the Cows'; and 'November,' purchased by the French government for the Marseilles Museum.

Harrison, Mary Saint Leger ("LUCAS MALET"), English novelist; b. Eversley, Hampshire. She is a daughter of Charles Kingsley (q.v.) and was married to Rev. William Harrison, rector of Clovelly, who died in 1897. She inherits the talent of the Kingsleys and her novels published under the pseudonym of "Lucas Malet" have been as widely popular in America as in England. They are marked by vigorous characterization and skilful construction, and include: 'Mrs. Lorimer' (1882); 'Colonel Enderby's Wife' (1885); 'Little Peter' (1887); 'A Counsel of Perfection' (1888); 'The Wages of Sin,' a notably strong tale (1891); 'The Carissima' (1896); 'The Gateless Barner' (1900); 'Sir Richard Calmady' (1901).

Harrison, Thomas, English regicide; b. Newcastle-under-Lyne 1606; d. London 13 Oct. 1660. He was a soldier of Parliament in the civil war and commanded the guard that carried King Charles from Hurst Castle to London, sat among his judges, and signed his death warrant. He fought at Worcester, but his uncompromising attitude in religion and politics was unacceptable to Cromwell and he was deprived of his commission, and later imprisoned for his share in some of the plots devised by the extremists. At the Restoration, he was seized, tried, and condemned to death.

Harrison, Thomas Alexander, American painter; b. Philadelphia 17 Jan. 1853. He studied painting under Gérôme in the Ecole des Beaux Arts at Paris, and first exhibited in the Salon of 1881. He was awarded the gold medal by the Pennsylvania Academy of Fine Arts in 1894 and elected an associate of the National Academy in 1898. His best known works are: 'Coast of Brittany'; 'Little Slave'; 'The Sea-Shore.'

Harrison, Susan Frances Riley, Canadian author; b. Toronto 24 Feb. 1860. She was at one period literary editor of the Toronto 'Week' and has been a frequent contributor to American and English periodicals. She has written 'Crowded Out and Other Sketches' (1889); 'Pine, Rose, and Fleur-de-Lis' (1891); 'Down the River and Other Poems' (1891); and edited an anthology, 'French and English Native Writers' (1889).

Harrison, William Henry, 9th President of the United States; b. Berkeley, Charles County, Va., 9 Feb. 1773; d. Washington, D. C., 4 April 1841. He studied at Hampden and Sidney College, later pursued a course in medicine, and was about to be graduated as a practitioner, when the sudden death of his father gave him the liberty to disengage himself from a profession for which he had no natural bent nor aptitude. He received from Washington a commission in the army, and was soon on his way to Cincinnati, making the journey from Philadelphia to Pitts-

burg on foot, to join the regiment to which he had been assigned. He arrived at Fort Washington just after the defeat of General St. Clair's army. His first military service was to command a company of twenty men as an escort for a train of pack-horses to Fort Hamilton, a military post on the west bank of the Big Miami River from which the seat of Butler County was named. In 1793 he joined the new legion under General Anthony Wayne who made him an aide-de-camp, and in December of that year he took part in the expedition which repossessed General St. Clair's field of battle, and erected thereon Fort Recovery. He participated in all the engagements with the Indians and their British allies during this campaign, and displayed conspicuous gallantry at the Battle of Fallen Timbers. Shortly after the close of this campaign Harrison was advanced to the rank of captain and placed in command of Fort Washington. The position was largely a confidential one. The conduct of the Spaniards on the Mississippi was exasperating. French citizens and agents were engaged in exciting the people of Kentucky into a war with the Spanish of Louisiana with the object of thus embroiling our government with Spain and of forcing it into a league with France. Captain Harrison was instructed to prevent the passage down the river of boats laden with military stores belonging to the French agents. The English posts on the northern frontier, which had been held so long in violation of good faith, were now evacuated by the English in obedience to the Jay Treaty of 1794; the new garrison and supplies were sent to Fort Washington and forwarded thence through the wilderness under the supervision of the commandant of that post. In the spring of 1798 Harrison resigned his commission in the army and settled on a tract of land at North Bend about 16 miles from Cincinnati, but was immediately appointed by President John Adams as secretary of the Northwest Territory under Gen. Arthur St. Clair as governor. A year later he resigned this position to take his seat in Congress as the first delegate from the Territory. Up to this time the public lands had been sold in such vast tracts that none but men of wealth could buy them. Harrison secured the division of the land into small tracts and made it possible for the poor man to obtain a homestead. During that session of Congress a part of the Northwest Territory was formed into the Territory of Indiana. It included the present States of Indiana, Illinois, Michigan, Wisconsin, and a part of Minnesota, and contained a civilized population of nearly five thousand souls. Harrison was appointed its first governor by President Adams, and so satisfactory was his administration, he was successively reappointed by President Jefferson and President Madison. He was also made superintendent of Indian affairs. Governor Harrison organized the new government at Vincennes. Many difficult questions demanded his attention, but the most difficult and delicate was the restless and finally hostile attitude of the savages under the leadership of Tecumseh, and the preaching of Tecumseh's brother, "the Prophet." The beginning of open warfare by the Indians was averted many times by his calmness and courage. He made in all thirteen treaties with the Indians, and secured the cession from several tribes of more than three million acres of land on the Wabash and White Rivers. Tecumseh condemned these treaties on

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the ground that the land belonged to all of the Indians, and that a single tribe could not give a legal title without the consent of every other tribe. Harrison invited Tecumseh to Vincennes for a conference, and directed that he should bring with him not more than thirty warriors; but he came with four hundred completely armed. There were many evidences that treachery was intended, and but for the conciliatory methods of the governor, the council would have terminated in bloodshed. Nothing was accomplished by this interview, nor by a second in the following summer. Meanwhile, frequent depredations by the Indians made it evident that conciliatory measures could no longer be employed, and on 26 Sept. 1811 Harrison set out with 900 men to punish them. On 6 November, when the army was within a short distance of Tippecanoe, it was met by messengers demanding a parley. A council was agreed upon for the next day, but at 4 o'clock on the following morning, the treacherous savages fiercely attacked the camp of Harrison in an endeavor to take it by surprise. The fighting continued till daylight when the Indians were routed with great loss. In the war of 1812 Harrison was appointed to the chief command of the Northwest, and given a major-general's commission. He urged upon the government the importance of creating a navy on the Lakes. That advice was heeded, and the splendid achievement of Commodore Perry on 10 Sept. 1813, was made possible by the military sagacity of this accomplished soldier. Six days after Perry's victory General Harrison embarked his artillery and supplies for a descent on Canada. The British general, Proctor, burned the fort and navy-yard at Malden and retreated, closely pursued by Harrison who overtook him and his Indian allies led by Tecumseh near the river Thames. Within five minutes almost the whole British force was captured, and shortly afterward the Indians were completely routed, and their leader Tecumseh was slain. The battle of the Thames and Perry's victory ended the war in Upper Canada, and gave the United States undisputed possession of the Great Lakes excepting Lake Ontario.

The years between the War of 1812 and the presidential campaign of 1840 Harrison devoted in part to the service of his country, and in part to the life of a country gentleman. He was in turn a member of Congress, state senator in the general Assembly of Ohio, presidential elector, United States senator from Ohio, and minister to the United States of Colombia. In 1829 he retired to his farm at North Bend. In December 1839, he was nominated by the National Whig convention for the Presidency of the United States, with John Tyler of Virginia for vice-president. The campaign which followed was one of the most exciting in the history of the country. Political mass meetings and processions were introduced for the first time, and party watchwords and emblems were employed with telling effect. That canvass has commonly been called the "log-cabin and hard cider campaign." The eastern end of General Harrison's house at North Bend consisted of a log cabin covered with clapboards, and his table was reputed to be well supplied with good cider, instead of wines. Log cabins and hard cider thus became party emblems typifying republican simplicity. "Tippecanoe and Tyler too" was shouted and sung and emblazoned from one end

of the country to the other. Nothing could stem the tide of wonderful popular enthusiasm for the hero of Tippecanoe and the Thames. Van Buren, the Democratic candidate, received only sixty electoral votes out of two hundred and ninety-four. The death of the President occurred only thirty-one days after his inauguration. Consult Bostwick in Wilson's 'Presidents of the United States' (1894).

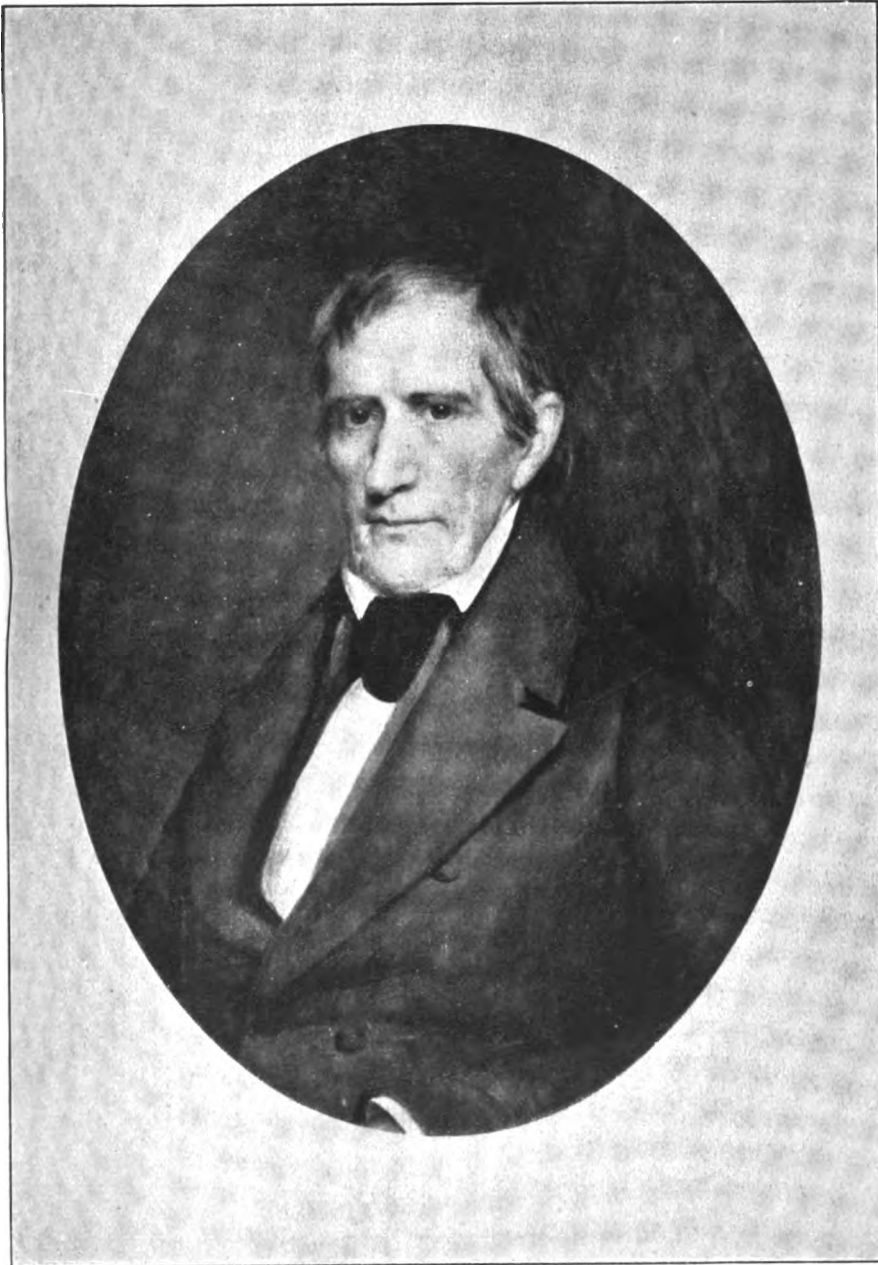
Harrison, Ark., town, county-seat of Boone County; on the St. Louis & N. A. railroad; about 120 miles northwest of Little Rock. It is in the lead and zinc section, and its industries are chiefly connected with mining. Considerable fruit is grown in the vicinity, and it has flour-milling and dairy interests. It is the seat of a collegiate and normal institute for women. The United States government building cost about \$80,000. Pop. (1910) 1,602.

Harrison, N. J., city in Hudson County; on the Passaic River, the Pennsylvania and the Erie R.R.'s. It is a suburb of Newark, and a sub-station of the Newark post-office, but has an independent municipal government. It was settled in 1668 and incorporated in 1873. The charter of 1873 is still in force, and by it the government is vested in a common council elected by wards. The chief manufactures are wire-cloth, marine-engines, steel, machinery, tubes, refrigerators, ink, beer, and leather. The water-plant is owned and operated by the city. Pop. (1910) 14,498.

Harrison, Ohio, village in the township of Harrison, Hamilton County, on the boundary between Ohio and Indiana, and on the Cleveland, C., C. & St. L. railroad, 23 miles by rail west-northwest of Cincinnati. The village situated on the north bank of the Whitewater River, a tributary of the Great Miami, in a fertile farming section, has manufactures of furniture, sashes, blinds, brushes, bricks, shoes, a corn-drill factory, a cannery, and lumber, flour, and roller mills. Its public buildings include a high school and six churches. Pop. (1910) 1,368.

Harrisonburg, Va., town, county-seat of Rockingham County; on the Chesapeake & W., the Southern, and the Baltimore & O. R.R.'s; about 100 miles northwest of Richmond. It is in the Shenandoah Valley, and is surrounded by a rich agricultural country. Its chief manufactures are flour, staves, saw and planing mill products, foundry and machine shop products, and pottery. It is the trade centre for the greater part of the county. The town owns and operates the water-works. Pop. (1910) 4,879.

Harrisonburg, Engagement Near. Harrisonburg, Va., on the Great Valley Turnpike, 22 miles north of Staunton, and 122 miles northwest of Richmond, was the scene of many stirring events in the Civil War. The place was occupied by Gen. Banks late in April 1862, and abandoned when Jackson forced Banks down the valley in May. When Jackson, in turn, was forced up the valley by the combined armies of McDowell and Fremont, he abandoned the main valley, moving from Harrisonburg to Cross Keys and Port Republic, his rear-guard, two regiments of Virginia cavalry, under Gen. Turner Ashby, halting about two miles south-east of Harrisonburg. On 6 June 1862 Col. Wyndham, with the First New Jersey cavalry and a battalion of the Fourth New York, moving from Harrisonburg, attacked Ashby and



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was defeated and followed to within one mile of the town, with the loss of several men killed and wounded, and about 60 taken prisoners, including Wyndham himself. Gen. Bayard then pushed forward with cavalry and infantry and Ashby fell back and called for infantry support. Jackson sent him Stuart's brigade—First Maryland, Forty-fourth, Fifty-second, and Fifty-eighth Virginia. A few miles beyond Harrisonburg Bayard attacked with the Pennsylvania "Bucktails" under command of Lieut.-Col. T. L. Kane, and in the engagement Ashby was killed, and Kane was wounded and captured. While this was happening on the right, the Sixtieth Ohio infantry and First Pennsylvania cavalry, on the left, drove in the Confederate skirmish-line, without loss on either side. As soon as the wounded could be removed the Confederates fell back in the direction of Port Republic, and the Union forces retired to Harrisonburg. The Union loss in the engagement was 65 killed, wounded, and missing. The Confederate loss including Ashby, was 18 killed, 50 wounded, and 3 missing. Consult: 'Official Records,' Vol. XII.

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Harrisonville, Mo., city, county-seat of Cass County; on the Missouri, K. & T., and the Missouri P. R.R.'s; about 30 miles southeast of Kansas City. It is situated in an agricultural and stock-raising region and the trade and manufactures are connected chiefly with the products of the surrounding farms. The shipping consists mostly of grain, live stock, lumber, and dairy products. Pop. (1910) 1,947.

Harrisse, här-ēs', Henri, American critic, bibliographer, and historian: b. Paris 1830, of Russian-Hebrew parentage. He became a citizen of the United States, and for several years practised law in New York. He has published 'Bibliotheca Americana Vetustissima' (1866); 'Christopher Columbus' (1884-5); 'John and Sebastian Cabot' (1883); 'The Discovery of North America'; etc.

Harrodsburg, Ky., city, county-seat of Mercer County; on a branch of the Southern railroad; about 45 miles southwest of Lexington and 58 miles southeast of Louisville. It is the oldest permanent settlement in the State, and was founded by James Harrod in 1774. Two years later Kentucky was incorporated as one of the counties of Virginia and Harrodsburg was made the county-seat. Stock-raising and farming are the principal occupations in the surrounding country. It has flour and planing mills, a distillery, brick-yard, and ice factory. The climate, scenery, and the Greenville Springs nearby make it a pleasure and health resort. It is the seat of Beaumont College, an institution for women, opened in 1894. Pop. (1910) 3,147.

Harrow School, England, an academic institution situated at Harrow-on-the-Hill, a town of Middlesex, 12 miles northwest of London. It is one of the famous public schools of England and was founded by John Lyon in 1571. The original red brick school house, now the Fourth Form School, was built 1608-15. New buildings were added in 1819 and since, the chief of these being the Vaughan Memorial Library (1863), and the semi-circular speech-room (1877). The school was primarily intended to afford free education to 30 poor boys of the parish; but provision was also made for the admission of 'so many foreigners as the place can conveniently

contain.' The age of admission is 12 to 14; and there are six entrance scholarships of from \$150 to \$400 per annum, offered every Easter. The most valuable learning scholarships are Baring's three of \$500 a year for five years to Hertford College, Oxford. Among the distinguished alumni of Harrow are Dr. Parr, Theodore Hook, Sheridan, Byron, Palmerston, Anthony Trollope, and Cardinal Manning. Under the Public Schools Act of 1868 the governing body comprises six members, elected respectively by the Lord Chancellor, the universities of Oxford, Cambridge and London, the Royal Society and the undermasters.

Hart, Albert Bushnell, American historian: b. Clarksville, Pa., 1 July 1854. He was graduated from Harvard in 1880, subsequently becoming professor of history there. He has written: 'Coercive Powers of the United States Government' (1885); 'Formation of the Union'; 'Introduction to the Study of Federal Government' (1890); 'Studies in American Education' (1895); 'Life of Salmon P. Chase' (1899); 'Practical Essays on American Government' (1893); etc. He has also edited 'American History Told by Contemporaries' (1898-1901); 'American Citizen Series' (1899); and since 1895, the 'American Historical Review.'

Hart, James McDougal, American painter: b. Kilmarnock, Scotland, 10 May 1828; d. 1901. He came to the United States in 1831, and studied art under his brother William (q.v.), and at Düsseldorf in the studio of Schirmer (1851). He was elected a member of the National Academy in 1859, and devoted himself principally to American forest scenery with a preference for autumnal effects. His 'Landscape with Cattle' is in the New York Metropolitan Museum, and his best known pictures are 'On the Croton'; 'Morning in the Adirondacks'; and 'Oaks in Autumn.'

Hart, James Morgan, American scholar: b. Princeton, N. J., 1839. He was the son of John S. Hart (q.v.). He was graduated from Princeton in 1860, studied in Göttingen, and took the degree of A. M. from Princeton in 1863. He was professor of modern languages at Cornell (1868-72); professor of modern languages and English literature in the University of Cincinnati (1876-90); returning to Cornell as professor of rhetoric and English philology in 1890. He has written: 'German Universities' (1874); 'Syllabus of Anglo-Saxon Literature' (1887); 'Hand-book of English Composition' (1895); has revised and edited his father's 'Manual of Composition and Rhetoric' (1897); and has translated 'German Classics' and 'Goethe Prose Selections.'

Hart, Joel T., American sculptor: b. Clarke County, Ky., about 1810; d. Florence, Italy, 2 March 1877. He was of humble parentage, and in 1830 entered a stone-cutter's establishment in Lexington. He was induced to attempt modeling busts in clay, and among others, Gen. Jackson and Cassius M. Clay (q.v.) sat to him, the latter giving him his first commission for a bust in marble. This when completed proved so satisfactory that Hart was commissioned to execute a marble statue of Henry Clay. He began this, but various delays prevented its completion, and it was not set up in Richmond, Va., till 1859. Other important

works by Hart are 'Woman Triumphant' in the court-house, Louisville, Ky., and 'Il Penseroso.' He was particularly well known for his portrait busts.

Hart, John, American patriot: b. Hopewell, N. J.; d. there, at an advanced age, 1780. Frequently elected to the colonial assembly he was prominent especially in the legislation for local improvements. In 1774 he was chosen to the general Congress at Philadelphia, where he was noted for his sound judgment and inflexible determination; was re-elected in the two following years, and was one of the signers of the Declaration of Independence. New Jersey was soon invaded by the British army, his estate devastated, and special exertions were made to take him prisoner. The capture of the Hessians by Washington permitted his return home.

Hart, John Seeley, American educator: b. Stockbridge, Mass., 28 Jan. 1810; d. Philadelphia 26 March 1877. He was for many years principal of the New Jersey State Normal School, at Trenton, and subsequently professor of English literature at Princeton College. His textbooks on English and American literature had a wide circulation, and in the long course of his career as educator he did much to stimulate a taste for good literature among students.

Hart, Sir Robert, English diplomatist, director of the Chinese imperial maritime customs: b. Portadown, County Armagh, Ireland, 1835. He was educated at the Taunton Wesleyan School, and was graduated at Queen's College, Belfast. He entered the British consular service in China in 1854, was appointed inspector-general of customs in 1863 and accepted his present position in 1885. During the Boxer outbreak in 1900, he underwent the siege in the British legation, at Peking, and since then has published his views on the position of things in China in a very remarkable work, 'These From the Land of Sinim' (1901). He attributes the disturbances in China to the arrogance of foreigners and the unyielding pride of the Chinese. He discusses China's army, law, transportation, communication, currency, education, administration, and religion in a highly optimistic vein, and shows that the Chinese government does a great deal better than it gets credit for. He is a firm believer in the Chinese plans for reform. He is certainly deeply trusted by the Chinese authorities and is one of the best oriental administrators that England has ever been blest with in China.

Hart, Samuel, American Episcopal clergyman: b. Saybrook, Conn., 4 June 1845. He was graduated from Trinity College in 1866, and was ordained priest of the Episcopal Church in 1870. He was at Trinity College as assistant professor of mathematics (1870-3), professor of mathematics (1873-83), and professor of Latin (1883-99). In 1899 he became vice-dean and professor of doctrinal theology at Berkeley Divinity School. In 1886 he was appointed custodian of the Standard Prayer Book of the Episcopal Church of the United States, in 1892, secretary of the House of Bishops, and in 1896, historiographer of the church. He is a member of several learned societies, including the American Historical Society, the American Oriental Society, and the Society of Biblical Literature and Exegesis. He is editor of 'Satires of Juvenal,' 'Satires of Persius,' and Bishop Seabury's 'Communion Office.'

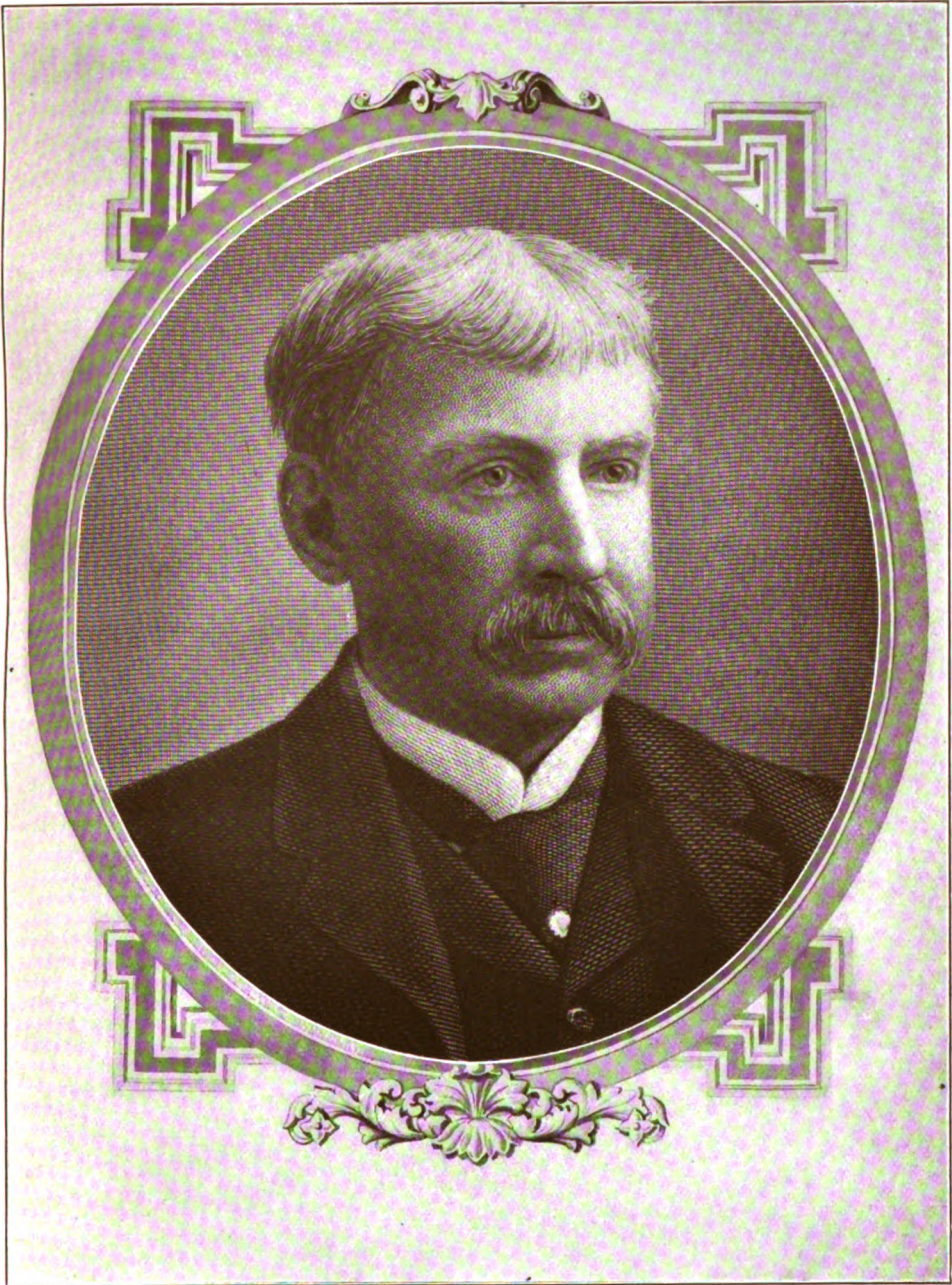
Hart, Thomas Norton, American merchant and politician: b. North Reading, Mass., 20 Jan. 1829. He entered business in Boston as partner in a mercantile firm, later founding a firm under the name of Hart, Taylor & Co. When he withdrew from this business, he became president of the Mount Vernon National Bank, and was connected with many eleemosynary institutions. He has also been active in politics, was a member of the common council, and of the board of aldermen; was nominated for mayor of Boston in 1887 and 1888, but defeated at the election; was, however, elected in 1889, 1890, 1900 and 1901.

Hart, William, American painter: b. Paisley, Scotland, 31 March 1823; d. Mount Vernon, N. Y., 17 June 1894. Emigrating with his parents to the United States in 1831, he settled in Albany, and was at first apprenticed to a firm of coachmakers, in Troy, by whom he was employed to paint the panels of coaches. He subsequently painted landscapes, portraits, and even window shades. In 1848 he became a regular exhibitor at the National Academy of Design, of which in 1858 he was elected as academican. He was president of the American Water Color Society 1870-3. He was a brother of James McDougal Hart (q.v.).

Hart, a hunting term, applied to the male, or stag, of the red deer after it has completed its full antlers at the age of six or seven years.

Hartbeest, härt'bēst, one of the large African antelopes of the genus *Bubalus*, specifically the caama (*B. cama*), formerly excessively numerous on the South African plains. They have long narrowing heads, doubly-curved, ringed horns, cow-like tails, and usually are of a grayish or reddish color, with decided markings on the face, especially in the bontebok (*B. pygargus*), blesbok (*B. albifrons*) and sassaby (*B. lunata*). All were noted for swiftness. Other very distinctive species are the konzi, tora, korigum and hunter's antelope. Most of these have become greatly diminished in numbers since about 1870.

Harte, Francis Bret, American novelist and poet: b. Albany, N. Y., 25 Aug. 1839; d. Aldershot, England, 6 May 1902. In 1854 he went to California, attracted there by the gold excitement. He was first a teacher at Sonora, then tried mining, in which he was unsuccessful. He next entered a printing-office, and in 1857 was compositor on the San Francisco 'Golden Era.' At that time he began to write short sketches, which appeared in the 'Golden Era,' and soon attracted attention; he was invited to join the staff of the 'Californian,' to which he contributed a series of clever parodies on famous contemporary writers of fiction, later published as 'Condensed Novels.' In 1864 he was appointed secretary to the United States branch mint; in 1868 became editor of the 'Overland Monthly,' for which he wrote 'The Luck of Roaring Camp' and others of his most successful stories of frontier life. In 1871 he went to New York and became a regular contributor to the 'Atlantic Monthly.' In 1878 he was appointed United States consul in Crefeld, Germany, and in 1880 received the consulship at Glasgow, Scotland. In 1885 his tenure of office as consul came to an end, and he settled in London, devoting his whole time to literary



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work. He was a prolific writer, and continued for the most part to deal with California themes. Among his shorter stories the following may be mentioned: 'Miggles'; 'The Outcasts of Poker Flat'; 'M'Liss' (1872); 'The Twins of Table Mountain' (1879); 'An Heiress of Red Dog' (1879); 'Flip' (1882); 'On the Frontier' (1884); 'By Shore and Sedge' (1885); 'Devil's Ford' (1887); 'A Phyllis of the Sierras,' and 'A Drift from Redwood Camp' (1888); 'The Heritage of Dedlow Marsh' (1889); 'A Sappho of Green Springs' (1891); 'The Bell-Ringer of Angels' (1894); 'A Protégé of Jack Hamlin's' (1894); 'Barker's Luck' (1896); 'Tales of Trail and Town' (1898); 'Stories in Light and Shadow' (1898); 'Mr. Jack Hamlin's Mediation' (1899); and 'From Sand Hill to Pine' (1900), a collection of short stories. His longer stories and novels include: 'Gabriel Conroy' (1876); 'Thankful Blossom: A Romance of the Jerseys' (1877); 'In the Carquinez Woods' (1883); 'Marnie' (1885); 'Snowbound at Eagle's' (1886); 'The Crusade of the Excelsior' (1887); 'Cressy' (1889); 'A Waif of the Plains' (1890); 'A Ward of the Golden Gate' (1890); 'A First Family of Tasajara' (1892); 'Colonel Starbottle's Client, and Some Other People' (1892); 'Clarence' (1895), dealing with incidents in the American Civil War; 'In a Hollow of the Hills' (1895); and 'Three Partners' (1897). He has also written much verse comprised in volumes entitled 'Poems' (1871); 'East and West Poems' (1871); 'Echoes of the Foot-Hills' (1874); and 'Some Later Verses' (1898).

In estimating Hart's work it must be remembered that it was his rare good fortune to break new ground, and to become the first literary interpreter of a life which with its primitive breadth and freedom, its striking contrasts of circumstance and character, offered singular opportunities to the novelist. That he ever did anything quite so good as his first group of stories and poems cannot be said, for his later volumes are marked, as a whole, by the repetition of well-worn motives and by declining spontaneity and power. Still, the average quality of his output remained high. Among qualities of his work those which perhaps most constantly impress the critical reader are his dramatic instinct, his keen insight into character, his broad sympathy, and his subtle and pervasive humor. Dealing for the most part with large, strongly marked, elemental types, as these develop and express themselves under conditions which give free play to instinct and passion, he does not indulge in lengthy analyses or detailed descriptions. His men and women are sketched with a few strokes, and left to work out their own personalities in speech and deed; and yet, such is the skill with which this is accomplished that they stand out before us as creatures of real flesh and blood. He did not purposely soften the shadows in his pictures; the sin and wretchedness of frontier life are frankly portrayed; none the less, there can be little doubt that consciously or unconsciously he contrived to throw an idealizing glamor over the mine and the camp, and that many of his most lifelike and successful characters are wrought in the imagination, though out of the stuff of fact. But it is here that we touch upon what is perhaps one of the finest qualities of his work,—a quality not to be sepa-

rated from his tendency toward idealization. Though he dwelt habitually upon life's unexplained and inexplicable tragic complexities, he nevertheless suffused his stories with an atmosphere of charity, clear, sweet, and wholesome.

Hartford, Conn., State capital, seat of Hartford County, port of entry, head of navigation on Connecticut River, 60 miles by water from Long Island Sound. Its steam railroad lines, all owned by the New York, New Haven & Hartford system, run in seven directions, making it the greatest inland railroad center in the Atlantic States save two. By the main line it is 110 miles to New York and 124 to Boston (a midway position which has enhanced its business, social, and cultural development), 36 to New Haven, 26 to Springfield, Mass.; by the old New York & New England lines, on the Highland Division 110 to Fishkill on the Hudson and 90 to Providence, R. I., and via Willimantic 117 to Boston; the Valley Division skirts the river to its mouth (47); the Connecticut Central runs to Springfield by the east side of the river; the Central New England to Poughkeepsie (109) and beyond to Erie and Lehigh connections. Its electric suburban lines, mostly under the same ownership (as is the city system), extend without change to Springfield (a line each side of the river), Rockville (17), Middletown (16), and Bristol via New Britain (21), besides Unionville (13), Rainbow (12), and South Glastonbury (10); and a line to Norwich (about 38) is nearing completion. Pop. (Dec. 1911) about 105,000.

Hartford lies on the west bank of the river (which divides it from East Hartford), on rolling ground. The first real hills are the Talcott Mountain range, half a dozen miles west; but the elevations of Prospect Avenue in the western part of the city and Fairfield Avenue in the southern afford a superb view across the entire Connecticut Valley, some 20 miles wide. It extends about 5½ miles north and south to Windsor and Wethersfield lines, by 3½ west to West Hartford line, about 18 square miles in all; the town and city are coterminous. It is divided about equally by the little Park River, which joins the Connecticut just south of the centre and is crossed by many bridges, whose dams afford large water power, and through whose bed runs the great main sewer into the Connecticut. The chief business street is Main, the original highway to Windsor and Wethersfield, following the river line along the first high ground, the banks of old being widely overflowed in the spring freshets; next State, east from Main to the steamer landing with the chief tobacco and other wholesale warehouses, opening at Main into a wide flare—formerly the market square for country produce teams, and paralleled on the south with Central Row, a block long—between them lying the City Hall with the post-office building in the rear; then Asylum opposite State, running west past the railroad station, and Pearl parallel opposite Central Row, joining Asylum at its foot by Ford; and Pratt parallel for a block on the north as far as Trumbull, whose section from Pearl to Pratt is of rising importance.

It is a place of remarkable beauty in business and public structures, parks, and (relatively to its size) unmatched extent of handsome resi-

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dential streets. Of the latter, the most distinguished are Washington Street with its magnificent arch of old elms, Asylum Avenue and part of Farmington Avenue, and Woodland Street (the costliest place in the city, the Goodwins' granite "palace" is at Woodland and Asylum), with some handsome places on Wethersfield Avenue (the chief, that of the widow of Samuel Colt of fire-arms fame, is now by legacy a home for old ladies). One of the finest streets, Prospect Avenue (North) is the West Hartford boundary, and long built up only on that side to escape Hartford taxes, a reason now obsolete; handsome places extend well into West Hartford.

The Connecticut is spanned by a superb granite bridge at Morgan Street, finished in 1907; the largest in mass of any purely stone bridge in the world, and one of the greatest masses of cut stone of any kind. It has nine spans, and is 1,192.5 feet long, 82 feet wide (London Bridge is 42) with a clear roadway of 80 feet including 10-foot sidewalks, and its arches 45 feet above mean low water, with foundations 50 feet below. All above water is dressed and carved in graceful forms. Its cost was about \$1,600,000 by itself; but attendant improvements, including a broad boulevard to State Street along the river front, raised it to nearly \$3,000,000.

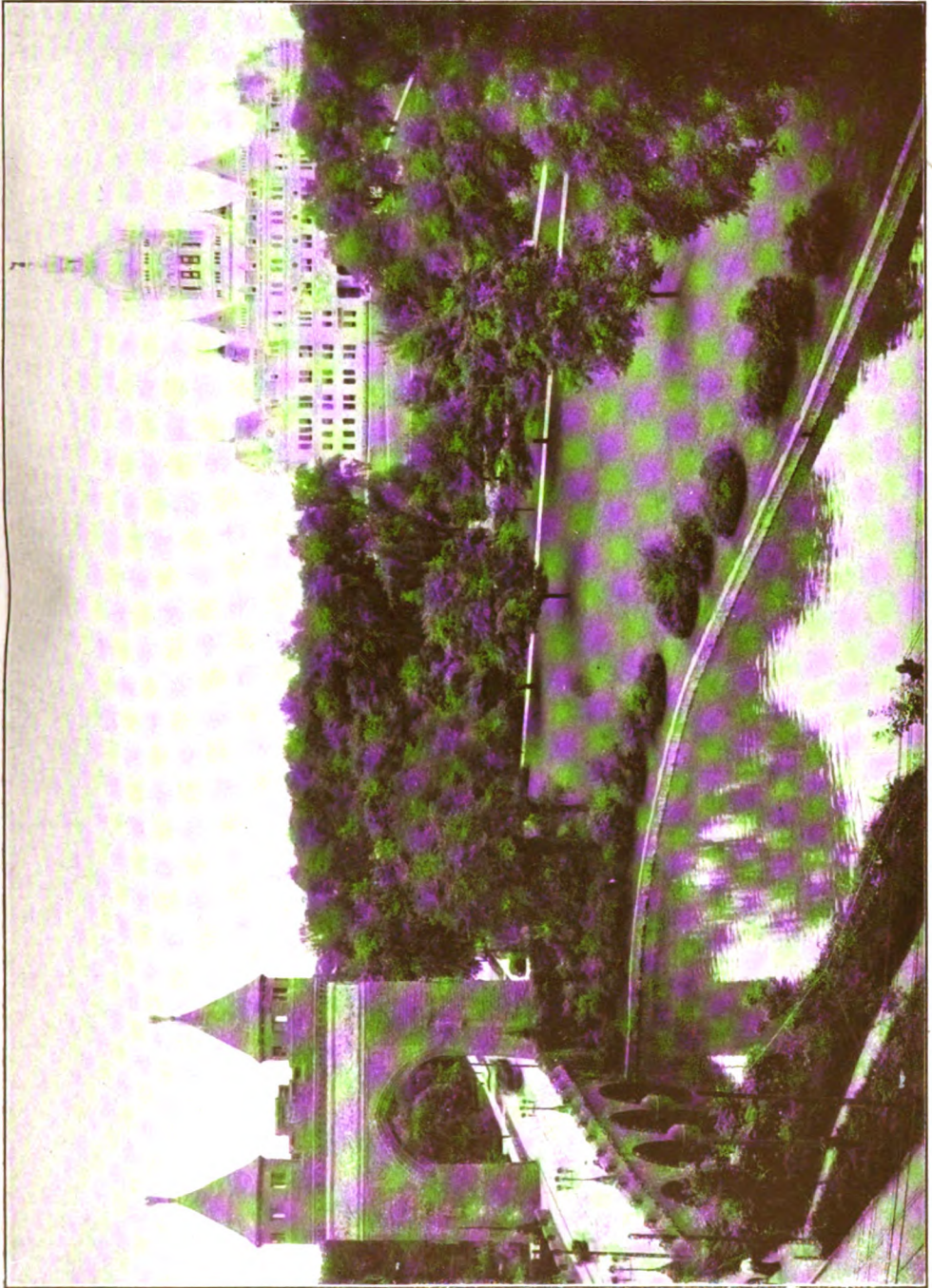
The park system contains above 1,300 acres: there are seven chief and smaller ones, lying in every quarter. The oldest is Bushnell Park (from the great preacher Horace Bushnell who secured its creation), in the heart of the city, 48½ acres; continued south on a sharp rise by the grounds of the State Capitol, where were formerly the buildings of Trinity College. The largest is Keney Park (formerly Ten-Mile Woods), purchased, prepared and maintained from the bequest of Henry Keney, in the extreme north, extending into Windsor, containing 663.4 acres. It is managed by private trustees, and is the only one from which automobiles are excluded. Next is Goodwin Park in the extreme south, some 200 acres, bought at a generously low figure from Francis Goodwin, Esq. Elizabeth Park in the extreme west, largely in West Hartford, of 100 acres, the bequest (with a maintenance fund) of Chas. M. Pond in memory of his wife, is the most beautiful in flowers and trees, and is the nursery for the other parks. Pope Park southwest of the centre, in the chief manufacturing district, is mainly the gift of the late Col. Albert A. Pope of bicycle fame, and has 92 acres, 19 being city additions. Colt Park, 106 acres, was the bequest of Mrs. Samuel Colt, and extends down to the neighborhood of the great fire-arms works. Riverside Park, 80 acres, is a reclamation and beautifying of the formerly squalid river front north from the stone bridge to the N. Y. & N. E. railroad bridge, and was laid out by the late Frederick Law Olmstead, a native of the city. The last two are most useful, being the only practicable resorts for the poor thousands near the river, and are the chief city playgrounds for active games. Rocky Ridge Park, 28 acres, is the long narrow strip of the old stone quarry (for street paving) next the bluff at and north of Trinity College, overlooking Zion Street and Parkville. There are several smaller squares and spaces: one of a block, Sigourney Square

in the west, is on the site of the old poor-farm pest-house grave-yard, shunned for building purposes, and has transformed the whole character of its neighboring residence section.

The city has a remarkable number of handsome and architecturally notable buildings. Foremost is the State Capitol, of white marble, towering over Bushnell Park; the handsomest in the country except the one at Albany, and architecturally surpassing that in many ways. It was completed in January 1880, at a cost of \$2,534,024.46; land and other expenses made the total \$3,342,550.73. The general plan was of 13th-century Gothic, but modern needs forced very much change in this. Each side is an individual and separately beautiful design; and the interior is as notable as the exterior. Its extreme length is 295 feet 8 inches; depth of centre part, 189 feet 4 inches; depth of wings, 111 feet 8 inches; height from ground line to top of crowning figure, 256 feet 6 inches. It is fire-proof, the only fire-proof capitol in existence. It is still more curiously distinguished as being the only considerable public building in America built within the appropriation. The State Library and Supreme Court, formerly in the Capitol, have been moved since 1910 into a new and splendid building just south, costing \$1,375,000; of granite, Italian Renaissance style, fire-proof throughout (the only one of its kind), 294 feet 8 inches frontage on Capitol Avenue, and 137 feet 6 inches deep, the main entrance 90 feet back from the curb with a well-kept lawn. The State Arsenal and Armory, finished 1909, is the finest in the United States: of Mohegan granite, 325 x 275 and 166 feet high, occupying 1¼ acres, its drill-room holding 12,000 people. It is on virtually the west part of Bushnell Park across the Park River, near Broad Street. East of the Capitol, on Trinity Street, is the handsome white granite building of the Orient Fire Ins. Co. Trinity College (q.v.) has fine buildings on high ground in the south part, designed to form a quadrangle.

The south central section of Main Street on the east side is rapidly developing into one of the handsomest and most artistic street ranges in the country. To the old nucleus of the Aetna Life Ins. Co.'s white granite structure (formerly the Charter Oak Life's), and across an alley next south the Wadsworth Atheneum's dark-brown, castellated and towered building designed by Ithiel Town, have been added on the north of the first-named, first the nobly beautiful white granite home of the Aetna Fire Ins. Co., then the tall, gray, stone-faced steel building of the Travelers' Ins. Co., to be the largest business structure in the city; on the south of the Atheneum, the small but elegant memorial of Mrs. Samuel Colt, of Quincy granite and thus lighter colored than its neighbor, joined to the latter without break, and continued so by the white marble Morgan Memorial, erected by J. Pierpont Morgan (of Hartford birth) as part of a much greater whole to be finished in 1912, for a memorial to his father Junius Spencer Morgan, the eminent banker. A 65-foot way is reserved south of the Morgan Memorial grounds, and then are shortly to come the new municipal buildings, handsome classic structures of white granite. Going north, the City Hall (old State House), completed May 1796, is of double interest, architecturally and historically;

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THE STATE CAPITOL AND SOLDIERS AND SAILORS MEMORIAL BRIDGE AND ARCH,
IN BUSHNELL PARK

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it was designed by Charles Bulfinch, the architect of the U. S. Capitol, and the famous Hartford Convention of 1814 (q.v.) was held here. The post-office in its rear, of white granite, is a Mullins creation of the Grant era. Opposite this on State Street is the tall handsome building of the First National Bank. The red sandstone Cheney Building well north on Main Street, put up as a monument by the great silk firm, was designed by Henry H. Richardson (q.v.), the most original and influential of American architects. On the corner of Main and Pearl is the great office building of the Conn. Mutual Life Ins. Co., and down Pearl a short distance are the Phoenix Mutual Life and the National Fire on the south, and the Security Co. and the Conn. General on the north, with the Hartford Fire just beyond at Pearl and Trumbull. The Hartford Life is at Asylum and Ann. Of the individual bank buildings, the most impressive are the Hartford National's 11-story skyscraper on the north corner of Main and Asylum, the tallest building in the city outside the Capitol and Armory; the First National, above; the Phoenix, Main just south of Asylum; and the Society for Savings on Pratt Street. There are many other attractive business and public structures. The two leading hotels are the Allyn (Asylum and Trumbull) and the Heublein (facing Bushnell Park at Mulberry and Wells). Of several handsome church buildings, St. Joseph's Cathedral (R.C.) is most striking: it is 26 x 178 feet, and 93 feet high, with two heavy towers intended to be crowned with spires. Of the others, Christ Church (P.E.) at Church and Main, St. Patrick's (R.C.) at Church and Ann, the Church of the Good Shepherd or Colt Memorial (P.E.) on Wyllys Street, Trinity (P.E.) on Sigourney Street, the Farmington Avenue (Cong., formerly the Pearl Street) at Farmington and Gillett, and the Church of the Redeemer (Univ.) on Asylum Avenue, east of the School for the Deaf, call for special notice architecturally. The Centre Church (Cong.), Main south of Pearl, is not only notable on the same grounds, but of the highest interest historically, as housing the oldest church society in the city, reaching back to its beginning.

Of the city monuments, the three most prominent for artistic effect are the Soldiers' Memorial Arch, forming a gateway into Bushnell Park across the Park River south of Pearl and Ford; the endlessly satisfying Corning fountain in that park, a gift from John J. Corning of New York,—a bronze with symbolical Indian figures, the work of J. M. Rhind; and the modified exedra in Colt Park, crowned by the statue of Col. Colt. It has also statues of Israel Putnam, by J. Q. A. Ward, an 8-foot bronze with granite pedestal, given by J. P. Allyn in 1874,—and Horace Wells of Hartford (the discoverer of anæsthesia) by Truman H. Bartlett, erected by State and city in 1875. The city has also two statues of Nathan Hale: one in the Capitol, by Karl Gerhardt, the other in front of the Wadsworth Athenæum, by E. S. Woods. One of the bridges across the river into Bushnell Park, that from Mulberry Street, is the gift of George E. Hoadley, Esq., in memory of his grandfather, Jeremiah Hoadley; it is of red granite and excellent workmanship. On North Main Street is a clock tower with chimes, erected from the bequest of Henry Keney, the giver of the great park.

The educational institutions are of high grade and distinction. At their head stands Trinity College (q.v.); Episcopal in origin and headship, but wholly non-sectarian in teaching, and with a singularly able corps of instructors. The Hartford High School, on Hopkins and Asylum just west of the railroad station, with 1,700 pupils, stands in the foremost rank, and is the most completely equipped in the country. Its present building is 426 feet long with an average of 50 feet wide, and has cost in buildings, land, and equipment, \$598,500; but land has been bought through to Broad Street, to erect buildings for a supplementary technical high school, which will then more than double the amount. Pupils from surrounding towns are admitted on payment. The city schools are on the district system, despite yearly attempts at the polls to consolidate them; but the taxes for their support are equalized by reapportionment. There are nine districts, with 18 buildings altogether. The school outlays are about \$650,000 a year. There are also three commercial colleges or schools, and a commercial high school at St. Joseph's Convent; four parochial R. C. schools, with some 2500 pupils, besides a convent school for Polish children. Hartford has also a theological seminary, the Hartford T. S. on Broad Street, managed by the Pastoral Union (Cong.) of Connecticut, with an affiliated School of Religious Pedagogy once famous at East Windsor; a Roman Catholic seminary for training priests, St. Thomas' on Collins near Woodland; and a missionary college and seminary at the Fathers of La Salette.

Religiously, Hartford is the seat of a Roman Catholic and a Protestant Episcopal bishop. There are 71 church societies, of which the Congregational (13), for a century the only one, Roman Catholic (10), Baptist (9), Episcopal (8), and Methodist (7), are the chief denominations. The Connecticut Missionary Society has its head office here. There are ten convents: four of the Sisters of Mercy (mother house in the State, established 1853), two of the Sisters of St. Joseph, two of the Sisters of the Holy Ghost, one of the Sisters of the Good Shepherd, and one of the Felician Sisters of St. Francis (Polish).

Its charitable and related institutions are renowned. It was the earlist seat of attempts to instruct the U. S. deaf and dumb, through Thomas Gallaudet and Laurent Clerc; and the St. Francis (Polish) School for the Deaf, formerly Deaf and Dumb Asylum, carries on the work in buildings on Asylum and Garden. The Retreat for the Insane (now renamed Hartford Retreat), on Washington Street, has endowments which reduce its charges to patients. The Hartford Hospital on South Hudson, St. Francis' Hospital at Collins and Woodland (R.C., but open to outside paying patients), the Hartford Orphan Asylum, the Watkinson Farm School, the Y. M. C. A., the City Mission and Open Hearth, the Hartford Social Settlement, the Old People's Home, Mrs. Colt's munificently endowed home for old ladies, and various other refuges for the aged, and indigent, are only part of its overflowing charities. One of the most useful is the Y. W. C. A. girls' boarding-house on Church Street, affectionately known among its friends as "the Home": it is managed so as to earn its expenses but make no profit, and

board is given to working girls at the lowest rate consistent with this. St. Elizabeth's Home (R.C.), Main opposite Park, does the same service for its class. The Connecticut Humane Society has also its head office in Hartford.

The library facilities of the city are extraordinary; and having been gathered by several different institutions for very diverse functions, are far more varied in contents and utility than if collected by any single one. There are ten public or class libraries, all cordially helpful to the investigator, containing toward half a million volumes, some 150,000 pamphlets, and fully 150,000 manuscripts. In the Wadsworth Athenaeum are housed the Hartford Free Public Library, with about 100,000 volumes; the Watkinson Library (reference only), with about 81,000 and some thousands of pamphlets (the only collections of art books of any extent are in these two); and the Connecticut Historical Society, with towards 30,000 and as many pamphlets, and nearly 50,000 manuscripts, its great field being genealogy and local history. The library of Trinity College, about 62,000, is strong in the demand by nearly a century of professors for the latest textbooks for their classes in many fields. That of the Theological Seminary (about 96,000, and some 50,000 pamphlets) is rich not only in its necessary specialty, but in English literature, mediæval history, music, sociology, "missionary" languages, and cognate subjects, and is very heavily endowed. The State Library has not only an immense collection (some 100,000 volumes) of public documents, legal reports and digests, State and other laws, Hansard's parliamentary debates (the one set in the city), and a fine general reference library, but has fully as many manuscripts, and is the authorized State depository of all local records in the State not needed for current use in their localities. It and Trinity are also official depositories of all U. S. government publications. The Hartford Bar Library in the County Court House (Trumbull and Allyn), the lawyers' working library, has some 8,500 volumes; and the Hartford County Medical Association, in the Hunt Memorial Building on Prospect Street (across the street from the Athenæum Annex, which contains the children's department of the Public Library), has a medical library and takes many current periodicals; and a large recent endowment will ultimately augment it to very important proportions. Two church libraries also have several thousand volumes each, and are of great service to both clergy and outside users: that in St. Joseph's Cathedral, for Catholic use especially, and that in the Centre Church House, on Gold Street.

The Wadsworth Athenæum is a peculiar institution. It is a board of trustees holding the buildings and grounds so named, and including the control and management of the Colt and the Morgan Memorial buildings, already mentioned; in addition, it houses in its buildings the three libraries just specified; and it is also a collector and exhibitor of art objects and museum contents of all kinds. These collections it now places wholly in the Morgan Memorial, which contains not only Mr. Morgan's matchless collection of tapestries, the finest in America, the magnificent illustrated catalogues

of his art treasures, his sets of Gould's Birds and Curtis' North American Indians, and other rare and valuable articles, but all the Athenæum's gallery of pictures, gifts and loans of the same, beautiful collections of pottery, silver-ware, bric-a-brac of all sorts, coins, etc., and also of minerals, birds and eggs, and other matters of natural history. Mrs. Colt's memorial has collections of fire-arms illustrating the development of the Colt revolver, and of art objects. Both these are connected with the old Athenæum building by passages on two floors, forming one unbroken interior as exterior. The Connecticut Historical Society has also an interesting and valuable collection of colonial relics.

Hartford, as the head of navigation and therefore distributing point for the Connecticut Valley, early gained an importance as a centre of wholesale trade which it has never lost; to accommodate this, the Hartford Bank, then the fifth and now the fourth oldest in the country, was organized in 1792. But its largest importance is now as one of the leading insurance centres in the world, and second in the United States. This business seemingly originated in marine insurance on its West India cargoes, and later added fire insurance, which speedily far overshadowed its mate. After tentative efforts in the 1790's, it became permanently established in 1803 as marine, and in 1810 as fire, in the Hartford Fire Ins. Co., followed in 1819 by the Aetna. Life insurance was begun in 1846 by the Conn. Mutual; accident in 1864 by the Travelers; steam boiler in 1866 by the Hartford S. B.; employers' liability in the early '90's by the Travelers; and live-stock in 1866 and 1867 by companies which abandoned it forever in 1868. The loans of these insurance companies, especially the life with their vast reserves, not restricted in investment by law, as are those of New York, have been one of the greatest agencies in developing the West, amounting to many hundred millions of dollars. There are now seven fire companies, the Hartford (largest in the U. S.), Aetna, Phoenix, Connecticut, National, Standard, and Hartford County Mutual, besides the U. S. branches of several foreign companies; six life companies, the Conn. Mutual, Aetna, Life, Phoenix, Mutual Travelers (life branch), Conn. General, and Hartford; two accident companies, the Travelers and the Aetna; and the original and largest steam-boiler insurance company of the U. S., the Hartford. There are 11 banks of discount, six of them national banks; four savings banks, one (the Society for Savings or "Pratt St. Bank") the oldest in Connecticut, chartered 1819, and by far the largest; and five trust companies.

The manufacturing interests are extremely heavy and varied, leading the world in several important lines: there are about 150 incorporated manufacturing companies in the city. The famous Colt works make all kinds of fire-arms, including Gatling guns, and also a great range of machinery for making special machines and tools, a line of work which engages other powerful Hartford companies; the city is the world centre for bicycle manufacture, through the Pope works, which also produce automobiles, as does their Columbia offshoot;

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two of the foremost typewriters, the Underwood and Royal, have their works here, and in amount and value of product it heads the world, as it does in horseshoe nails and leather belting; it is very prominent in electric machinery and vehicles, woven-wire mattresses, screws, machine tools and chucks, cyclometers, steam-boilers and engines, knitting and book-sewing machines, blowers, steam turbines, pumps, coil pipes, plumbers' and railway supplies, plated ware, and other heavy metal articles; and manufactures also church organs, rubber goods, pottery, furniture, carriages, harness, knit goods, and many other things. It has also one of the largest printing houses in New England, The Case, Lockwood & Brainard Printing Co., which has manufactured many famous works; three daily papers, the 'Courant' (morning, Rep.), the oldest newspaper in the country (founded 1764), 'Times' (evening, Dem.), and 'Post' (evening, Rep.); and a number of weeklies, monthlies, and quarterlies.

The mayor holds office for two years, and the city government is of the regular two-chambered form. The assessed valuation of property is above \$100,000,000, making it per capita one of the richest cities in the United States—about \$1,000 per head. The tax rate is something over two cents on the dollar, varying with the district school tax.

The first white settlement of Hartford was by the Dutch in 1633, at the junction of the Park and Connecticut, still called Dutch Point (although the original point is out in the Connecticut). They built there a fort called the "House of Hope" (commemorated by Huys-hope Avenue). (For the settlement of the Newtown men in 1635-6, and the adoption of the first written constitution of modern times, whence Hartford is called the "birthplace of American democracy," see CONNECTICUT.) Hartford was first named Newtown, changed to the present name in honor of its minister Samuel Stone's English birthplace. From here in 1637 sailed the expedition of 90 men under John Mason, which heavily crippled and caused the ultimate destruction of the Pequots, the tribe of recent Indian invaders who had dispossessed the original Indian holders and terrorized the other Connecticut Indians, and who were making Connecticut untenable for civilized settlers. This campaign made possible Connecticut as it stands, and probably in any form. The Dutch were ejected from their fort in 1654; they had never really made a settlement. (For the attempt of Andros to seize the charter, in 1687, see CHARTER OAK.) In 1701 Hartford became joint capital with New Haven. In the Revolution, Hartford, as the head of the one rich store of supplies which the British could not seize, became of prime importance; the second commissary-general of the United States army, Jeremiah Wadsworth, was a Hartford merchant. Gov. Trumbull (Washington's "Brother Jonathan"), much of the time in Hartford, was also a strong reliance of Washington, who came to Connecticut to consult him; and in 1780 Washington and Rochambeau planned the Yorktown campaign here. The Hartford Convention (q.v.) of 1814 sat here. In 1873 Hartford became the sole capital of the State. From its original limits have been cut off the

towns of West Hartford, East Hartford, and Manchester (the latter directly from East Hartford).

Its native and adopted citizens have made the city one of the intellectual glories of New England. It was the birthplace of Noah Webster, Frederick Law Olmstead, John Fiske, and Edmund Clarence Stedman, and others of less note but of high merit; it had the services of Joel Barlow, George D. Prentice, John G. Whittier, and others—after the Revolution, so brilliant a group of Connecticut authors and professional men gathered here or made it their literary headquarters that they were known all over the country as the "Hartford Wits" (q.v.), and are still remembered by the name; it was the long or permanent residence of Harriet Beecher Stowe, Mark Twain, Charles Dudley Warner, and Horace Bushnell, besides John Trumbull the poet and Lydia H. Sigourney, and the remarkable Trumbull family—James Hammond the antiquarian, Indian scholar, and librarian, Gureton the nature painter, and Annie (Mrs. Slosson), the story-writer and entomologist. In the musical field, Dudley Buck the distinguished composer was born here; and Henry C. Work, of Middletown, the second greatest of American song-writers, lived much here and died here. In the business world, J. Pierpont Morgan was born here, his father Junius S. Morgan (by parentage and associations really a Hartford man himself) began his great business career as a Hartford dry-goods merchant, and Edwin D. Morgan the War Governor of New York began his as a Hartford wholesale grocer and provision merchant.

FORREST MORGAN,

Asst. Librarian, Watkinson Library.

Hartford, Mich., village of Hartford Township, Van Buren County, 15 miles west of Paw Paw on the Paw Paw River, and 17 miles northeast of Benton Harbor, on the Chicago & M. L. S. R.R. It has a graded school and five churches. It carries on a considerable traffic in agricultural produce and stock, has grain elevators, flour, saw-, and planing-mills, canneries, electric light plant, etc. Pop. 1,300.

Hartford, Vt., town of Windsor County, on the White River, about one mile above its junction with the Connecticut River, and 60 miles south of Montpelier, on the Central Vt. and on the Woodstock R.R.'s. It has many mills and manufacturing. Pop. (1910) 4,179.

Hartford City, Ind., city, county-seat of Blackford County; on the Pittsburg, C. C. & St. L. and the Lake E. & W. R.R.'s; about 45 miles southwest of Fort Wayne, and 60 miles northeast of Indianapolis. The natural resources which contribute to the industrial and commercial interests are the products from the surrounding agricultural country, the natural gas supply, and the oil fields. The city owns and operates the waterworks. Pop. (1910) 6,187.

Hartford Convention, of 1814: a gathering of New England Federalists to discuss measures for securing New England interests against the South and West, especially in relation to the War of 1812. The convention opposed the war on several grounds,—the vital objection being that it was destroying all American commerce in order to punish Great Britain, for crippling a part of it. It was believed by the delegates that

the agricultural States were sacrificing New England, whose life-blood was commerce, from ignorance mingled with sectional malice (see EMBARGO). All through the war, the New England Federalists, impoverished and excluded from the national councils harassed and hampered the government in conducting it; the government retorted by leaving the whole section to its fate; the British inflamed the discord by exempting the New England coast from blockade, and the government countered by laying a new embargo which did the same work. All the New England States and New York were swept by the Federalists on this issue. In November 1813 the governor of Vermont recalled a brigade of militia from garrison duty; the government threatened prosecution, the Massachusetts legislature threatened to use the State power to support him. In the autumn of 1814 the destruction of New England industries had become intolerable; the coast was undefended, the British were occupying that of eastern Maine, and Congress was proposing a conscription so severe as to enlist minors without the consent of their parents; whereupon the Connecticut legislature ordered the governor to call a special session to protect its citizens if the measure were adopted. On 18 October the Massachusetts legislature proposed a convention of the New England States, to take action "not repugnant to their obligations as members of the Union," and "lay the foundation of a radical reform in the national compact" through a future national convention. Connecticut and Rhode Island accepted the proposal with similar qualification; New Hampshire was divided politically, and Vermont was excited over Macdonough's victory at Plattsburg, but certain counties sent delegates. The war was a growing and alarming failure. England was demanding the renunciation of the whole Northwest as the price of peace, national bonds were at 25 per cent discount. The government sent a regular army officer to oversee the convention, and use force if it attempted disunion; deputed secret agents to see if it was true that there was a plot to make New England an English grand-duchy under a prince of the blood; and appointed the succeeding 12th of January a national fast-day. The convention met at Hartford, Conn., 15 Dec. 1814, with 12 delegates from Massachusetts, 7 from Connecticut, 4 from Rhode Island, 2 from New Hampshire, and 1 from Vermont,—26 in all. George Cabot of Massachusetts was chosen president, Theodore Dwight of Connecticut, secretary. A secret session of three weeks was held, a report to the New England legislatures prepared and 5 Jan. 1815, the convention adjourned. The report stated the before-mentioned grievances, and charged the government with making naturalizations too easy and with destroying the balance of sections by forming new States at will out of the western territory; but denied any present intention to dissolve the Union. It was proposed that Congress should confide the defense of each State to the State itself, and return a share of its taxes for the purpose; and recommended seven changes in the Constitution, namely: abolition of the three fifths slave representation, the requirement of a two thirds vote for the admission of new States, the limitation of embargoes to 60 days, the requirement

of a two thirds vote to sanction the prohibition of commercial intercourse, or to declare war or hostilities except in case of invasion; the exclusion of naturalized foreigners from civil offices or a seat in Congress, and prohibition of a President's re-election. They proposed also that two Presidents in succession should never be elected from the same State. They also recommended that another convention should be held at Boston the following June if affairs did not mend or the amendments were rejected. The Massachusetts and Connecticut legislatures adopted the report and sent commissioners to Washington; but before they arrived a satisfactory peace was made, all disasters forgotten in the blaze of the battle of New Orleans, and the promoters of the convention detested as traitors preparing to secede. They were in fact killed for public life. But in 1819 Cabot deposited the journal of the convention with the Massachusetts secretary of state as a permanent testimony that nothing treasonable was attempted; in 1833 Dwight wrote its history.

Hartford Fern. See *Filicales* (2), under FERNS AND FERN ALLIES.

Hartford Theological Seminary, an institution founded in 1834 for the education of Congregational preachers, at East Windsor Hill, Conn. It was formerly called the Theological Institute of Connecticut, and took its present name on its removal to Hartford in 1865. Its control is vested in a board of trustees elected by the Pastoral Union, an association of 200 ministers who have subscribed to the creed of the Union. The aim of the institution is to train ministers for pastoral work on the broadest lines of intellectual and spiritual life.

Hartford Wits, the name admirably given by the cultivated circles of the United States to a group of Connecticut professional men and literary aspirants, who lived in Hartford or met there for converse and collaboration, from shortly after the Revolution till toward 1800. The exact composition of the group is not uniformly agreed upon; but the unquestioned members were Richard Alsop (perhaps its leading spirit, and the most prolific contributor to its joint efforts), Joel Barlow, Theodore Dwight, Lemuel Hopkins and David Humphreys. Benjamin Trumbull the historian is sometimes added. Most of them were Yale men; all were strong Federalists, like nearly all cultivated New-Englanders of the time; and their writings had little of pure literature compared with envenomed politics. The very name of their "Anarchiad," modeled on the English "Rolliad," and like it a joint political satire in heroic verse, expresses its purpose. Another collaboration was the "Echo," a set of satires, burlesques, and parodies mostly in the same form, written 1791-5, and published in a volume in 1807. "The Political Greenhouse" was another.

Har'tington, Spencer Compton Cavendish, MARQUIS OF. See DEVONSHIRE, SPENCER COMPTON, DUKE OF.

Hartington, Neb., city, county-seat of Cedar County; on Bow Creek, and on the Chicago, St. P. & O. R.R.; about 42 miles west by north of Sioux City, Ia., and 18 miles south by east of Yankton, S. D. It is in a fertile agricultural region and is the commercial centre of Cedar County. Pop. 1,000.

Hartley, Jonathan Scott, American sculptor: b. Albany, N. Y., 23 Sept. 1845. After spending several years in studying art in England, Rome, and Paris, he established himself in New York where he was professor of anatomy in the schools of the Art Students' League, 1878-84, and president of the league, 1879-80. Among important works by him are: 'King René's Daughter'; 'The Whirlwind'; the Miles Morgan statue at Springfield, Mass.; 'Daguerre monument, Washington, D. C.; Ericson monument, New York; statue of Alfred The Great, for Appellate Court building, New York (1900); statue of Thomas K. Beecher, Elmira, N. Y. (1901); etc.

Hartman, Sadikichi, American author and artist: b. Nagasaki, Japan, 1867. He was educated in Germany. He has published 'Schopenhauer in the Air' (1899); 'Shakespeare in Art' (1901); 'Modern American Sculpture' (1901); etc.

Hartmann, Karl Robert Edouard von, b. Berlin 23 Feb. 1842; d. 6 June 1906. He was educated for the army, but an injury to his knee compelled him to leave the service in 1865. He then began the study of philosophy, and for many years lived the retired life of a student. His most important publications are: 'The Philosophy of the Unconscious' (1869); 'The Phenomenology of the Moral Consciousness' (1879); 'The Religious Consciousness of Mankind in the Stages of its Development' (1881); and 'The Religion of the Spirit' (1882). Among his other works are: 'Critical Grounds of Transcendental Realism'; 'The Crisis of Christianity in Modern Theology' (1880); 'Judaism in the Present and the Future' (1885); 'Lotze's Philosophy' (1888); 'The Ghost Theory in Spiritism' (1891); 'The Fundamental Social Questions' (1894); and many other works on society, religion, etc.

Von Hartmann's philosophy is called by its author a transcendental realism, because in it he professes to reach by means of induction from the broadest possible basis of experience a knowledge of that which lies beyond experience. A certain portion of consciousness, namely sense-perception, begins, changes, and ends without our consent and often in direct opposition to our desires. Sense-perception, then, cannot be adequately explained from the ego alone, and the existence of things outside experience must be posited. Moreover, since they act upon consciousness and do so in different ways at different times, they must have those qualities assigned to them which would make such action possible. Causality is thus made the link that connects the subjective world of ideas with the objective world of things. An examination of the rest of experience, especially such phenomena as instinct, voluntary motion, sexual love, artistic production, and the like, makes it evident that will and idea, unconscious but teleological, are everywhere operative, and that the underlying force is one and not many. This thing-in-itself may be called the Unconscious. It has two equally original attributes, namely, will and idea. Hegel and Schopenhauer (qq.v.) were both wrong in making one of these subordinate to the other; on the contrary, neither can act alone, and neither is the result of the other. The will is illogical and causes the existence, the *Das* of the world; the idea, though not con-

scious, is logical, and determines the essence, the *Was*. The endless and vain striving of the will necessitates the great preponderance of suffering in the universe, which could not well be more wretched than it is. Nevertheless, it must be characterized as the best possible world, for both nature and history are constantly developing in the manner best adapted to the world-end; and by means of increasing consciousness the idea, instead of prolonging suffering to eternity, provides a refuge from the evils of existence in non-existence.

The original state of the Unconscious is one of potentiality, in which by pure chance the will begins to strive. In the transition state, called that of the empty will, there is no definite end; and to avoid the unhappiness of aimless desire the will realizes the ideas already potentially present and the Unconscious becomes actual. The existence of the universe is the result, then, of the illogical will, but its characteristics and laws are all due to the idea and are, therefore, logical. The history of the world is that given by natural science, and particular emphasis is laid upon the Darwinian theory of evolution (q.v.). Man is developed from the animal, and with the appearance of the first human being the deliverance of the world is in sight, for only in man does consciousness reach such height and complexity as to act independently of the will. As consciousness develops, there is a constantly growing recognition of the fact that deliverance must lie in a return to the original state of non-willing, which means the non-existence of all individuals and the potentiality of the Unconscious.

The one foundation for ethics is pessimism, for no other view of life recognizes that evil necessarily belongs to existence and can cease only with existence itself. The essential feature of the morality built upon this basis is the realization that all is one and that, while every attempt to gain happiness is illusory, yet before deliverance is possible, all forms of the illusion must appear and be tried to the utmost. Even he who recognizes the vanity of life best serves the highest aims by giving himself up to the illusion, and living as eagerly as if he thought life good. It is only through the constant attempt to gain happiness that men can learn the desirability of nothingness; and when this knowledge has become universal, or at least general, deliverance will come and the world will cease. No better proof of the rational nature of the universe is needed than that afforded by the different ways in which men have hoped to find happiness and so have been led unconsciously to work for the final goal. The first of these is the hope of good in the present, the confidence in the pleasures of this world, such as was felt by the Greeks. This is followed by the Christian transference of happiness to another and better life, to which in turn succeeds the illusion that looks for happiness in progress, and dreams of a future made worth while by the achievements of science. All alike are empty promises, and known as such in the final stage, which sees all human desires as equally vain and the only good in the peace of Nirvana.

The relation between philosophy and religion lies in their common recognition of an underlying unity, which transcends all the apparent differences and divisions due to individual phe-

nomena. Many changes must take place in the existing religions before they will be suited to modern conditions, and the resulting religion of the future will be a concrete monism.

The Philosophy of the Unconscious has been the subject of many different estimates, but is regarded as having less intrinsic than historical value. Its influence upon other thinkers was especially marked during the years following its first appearance, but at present that influence has much decreased.

Bibliography. — Schneidewin, 'Lichtstrahlen aus Edouard von Hartmanns säuntlichen Werken'; Koeber, 'Das philosophische System Edouard von Hartmanns'. Consult also Erdmann, 'History of Philosophy', and Falckenberg, 'History of Modern Philosophy'.

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Hartmann, Moritz, Austrian poet and novelist: b. Duschnik, Bohemia, 15 Oct. 1821; d. Vienna, 13 May 1872. He was educated at Prague and Vienna and taught in Vienna till 1844, when he left the country on account of his political liberalism. Upon his return to Austria he was imprisoned but released by the revolution of March 1848. He sat in the Frankfort Parliament of 1848 but fled from Vienna to escape imprisonment and took part in the "Rump Parliament" at Stuttgart. From 1849-68 he was in voluntary exile in foreign countries; was Paris correspondent of the 'Kölnische Zeitung' and represented it in Crimea during the Russo-Turkish war; in 1860 lectured on German history and letters in the Academy at Geneva; and in 1865 became one of the editors of the 'Neue Freie Presse'. He wrote: 'Kelch und Schwert' (1845); 'Neure Gedichte' (1847); 'Reimchronik des Pfaffen Marizius' (1849); 'Der Krieg um den Wald' (1850); 'Schatten' (1851); 'Adam and Eve' (1851); 'Tagebuch aus der Provence und Languedoc' (1853); 'Briefe aus Irland'; 'Der Gefangene von Chillon' (1863); 'Die letzten Tage eines Königs' (1866); 'Nach der Natur' (1866); 'Die Diamanten der Baronin' (1868); etc. His select poems were edited in 1874 and his works in 1873-74 (10 vols.).

Hartranft, här'tränft, Chester David, American educator: b. Frederick Township, Montgomery County, Pa., 15 Oct. 1839. He was graduated at the University of Pennsylvania in 1861 and at the New Brunswick Theological Seminary in 1864; was pastor of the Dutch Reformed church at South Bushwick, N. Y., in 1864-6, and of that in New Brunswick, N. J., in 1866-78. In 1879 he was appointed professor of ecclesiastical history at the Hartford Theological Seminary; in 1888 was elected its president, and held the chair of Biblical theology 1892-7 and of ecclesiastical dogmatics from 1897 to 1903. He resigned the presidency in 1903 to engage in literary work in Germany. He was at one time president of the Conservatory of Music at New Brunswick, N. J.

Hartranft, John Frederick, American soldier: b. New Hanover, Pa., 16 Dec. 1830; d. Norristown, Pa., 17 Oct. 1889. He was graduated at Union College in 1853, and in 1859 was admitted to the bar. At the outbreak of the Civil War he organized the 51st Pennsylvania regiment, was made its colonel, and with it participated in Burnside's expedition to North Car-

olina (1862). He also commanded the regiment in a charge at Antietam, and at Fredericksburg. In March 1865, he commanded a division of the Ninth corps in their assault on Fort Steadman, and was brevetted major-general. He was elected auditor-general of Pennsylvania in 1865, and re-elected in 1868. From 1872 to 1878 he was governor of Pennsylvania, and thoroughly reorganized the Pennsylvania militia, which from 1879 he commanded, with rank of major-general.

Hart's-horn, the horn of the common stag and its decomposition products. The substances derived from the horns were the volatile liquor, salt, and oil, and the ash which remains when the horns are calcined in the air. The fluid portions are got by destructive distillation in a convenient still, and are separated, the salt mechanically, and the others, after washing with water, by repeated rectification either alone or with quicklime, by which the more volatile portions are got free from the tarry matter and heavier oils. The salt which is formed in this operation is ammoniac carbonate, which in part condenses the neck of the retort, in part is washed over by the aqueous vapor into the receiver; and when the ammonia is got pure from the distillate and is condensed in water it constitutes the spirit of hart's-horn. The volatile alkali or spirit of hart's-horn is now no longer obtained from that source, except in special circumstances; the ammonia of commerce is now obtained from gas-liquor, from blast-furnaces, or from other sources.

Hart'suff, George Lucas, American soldier: b. Tyre, Seneca County, N. Y., 28 May 1830; d. New York 16 May 1874. He was graduated from West Point in 1852, entered the artillery, was on duty on the frontier and in Florida in the Civil War became assistant adjutant-general, with rank of captain, in 1861, and major in 1862. Later appointed major-general of volunteers, he was one of the board for revision of the rules and articles of war and the preparation of a code for the government of the armies in the field. He was mustered out of the volunteer service in 1865, and in 1871 was retired from the regular army with rank of lieutenant-colonel and brevet major-general.

Hartsville, Engagements at. Hartsville, Tenn., on the north bank of the Cumberland River, about 35 miles northeast of Nashville, is an important crossing and connected by good roads with Lebanon on the south and Gallatin on the northwest. In August 1862 Gen. John H. Morgan, with his Confederate command, was operating north of the river and Gen. R. W. Johnson, with a cavalry command, was sent to drive him back. Johnson, approaching on the Gallatin road, attacked Morgan 21 August, near Hartsville, and was defeated with a loss of 80 killed and wounded, and 75 prisoners.

On 6 Dec. 1862 Hartsville was held by Col. A. B. Moore, with a Union force of three regiments of infantry, a regiment and a company of cavalry, and a section of artillery, in all about 2,100 men. Morgan had been instructed by Gen. Bragg to operate on Gen. Rosecrans' lines of communication in rear of Nashville and, learning that Moore was isolated, with no supports near, resolved to capture him. While two infantry brigades of Cheatham's division

and Wheeler's cavalry demonstrated on Nashville, Morgan, with four regiments and a battalion of cavalry, two regiments of infantry, and a battery, set out from Baird's Mills, 25 miles south of Hartsville, on the morning of 6 Dec. 1862, marched through Lebanon, crossed the Cumberland below Hartsville, during the night, disposed his forces so as to cut off Moore's retreat on the roads leading to Gallatin and Castalian, posts occupied by other Union commands, and early in the morning of 7 December, closed in on the Union camp, surprised it, attacked the troops, who were being hastily drawn up to receive him and, after a stubborn fight of an hour and a half, defeated and captured the entire command. Col. John M. Harlan, in command of a small Union brigade at Castalian Springs, nine miles away, hearing the noise of battle, marched to Hartsville and attacked Morgan's rear-guard as it was recrossing the river, recapturing some of the wagons taken. The Union loss was 58 killed, 204 wounded, and 1,834 captured and missing. The Confederate loss was 21 killed, 104 wounded, and 10 missing. Consult: 'Official Records,' Vol. XX.

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Hartt, Charles Frederick, American geologist: b. Fredericton, N. B., 23 Aug. 1840; d. Rio de Janeiro, Brazil, 18 March 1878. He was a pupil of Agassiz in the Museum of comparative anatomy at Harvard, and accompanied the great naturalist as geologist of a Brazilian expedition (1865). During this expedition he explored the coast from Bahia to Rio, made extensive zoological collections, and by his researches made himself a leading authority on the natural history of South America. In 1875 he was appointed chief of the geological surveys of the empire of Brazil. He was also from 1876 director of the National Museum at Rio, where are deposited his collections, the most complete of South American geology in existence. He published: 'Geology and Physical Geography of Brazil' (1870), and 'Contributions to the Geology and Physical Geography of the Lower Amazon' (1874).

Hartwell, Ga., town and county-seat of Hart County, the terminal of a branch of the Southern railway, 50 miles northeast of Athens. Its educational institutions include a high school. There are cotton, flouring, and sawmills, and a fruit cannery. Pop. (1910) 2,007.

Hartwell, Ohio, village of Hamilton County, 11 miles north of Cincinnati, on the Cincinnati, H. & D. and on the Cleveland, C. & C. R.R.'s. It has manufactures of wagons and carriages and a general retail and agricultural trade. Pop. (1910) 2,823.

Harty, Jeremiah J., American Catholic prelate: b. St. Louis 1853. He was graduated from the St. Louis University in 1872, and took a theological course at St. Vincent's College, Cape Girardeau, Mo. He was ordained priest in 1878, and appointed assistant pastor of St. Bridget's parish in St. Louis, holding this position until 1888, when he was commissioned to build the church and organize the parish of St. Leo in the same city. His organizing work has been most successful, and in 1902 he built a school accommodating over 700 children. In 1903 he was appointed archbishop of Manila, the most important see in the Philippines.

Hartz'ell, Joseph Crane, American Methodist bishop and missionary: b. Illinois 1 June 1842. He was graduated from Wesleyan University and Garrett Biblical Institute (Evanston, Ill.), and in 1896 was elected missionary bishop to Africa where he has since been actively engaged in organizing missions. In June of 1903 he sailed from New York on his seventh missionary tour of inspection in Africa.

Harugari, hā-roo-gā'rē, a social and benevolent order established in the United States in 1847. It had in 1903 over 300 lodges with a total membership of 30,000. Its purpose is largely the preservation of German language, customs, and traditions.

Harun-al-Rashid, hā-roon'al-rāsh'īd, or **Haroun-al-Rashid**, caliph of Bagdad: b. Rhey about 765 A.D.; d. Thous 2 April 809. (See CALIPH.) The popular fame of this caliph is by the 'Arabian Nights' Entertainments, in which Harun, his wife Zobeide, his vizier Gaffar, and his chief eunuch Mesrur, are frequent and conspicuous characters. He was the fifth caliph of the dynasty of the Abbassides, and the most powerful monarch of his race. In 786 he succeeded his elder brother Hadi, who had vainly attempted to exclude him from the throne, and by his conquests and vigorous internal administration raised the caliphate of Bagdad to its greatest splendor, and made his reign esteemed the golden era of the Mohammedan nations. His favorite ministers were Yahia and his son Gaffar, of the ancient Persian family of the Barmecides, whose ancestors had for many generations been hereditary priests at the fire temple of Balkh, and who now rapidly exalted the family to the highest dignities under the caliphate.

Haruspices. See ARUSPICES.

Harvard, John, American clergyman, founder of Harvard University: b. England, probably in Middlesex; d. Charlestown, Mass., 24 Sept. 1638. He was entered as a pensioner at the university of Cambridge in 1628, was graduated B.A. in 1631-2, and M.A. in 1635, and having emigrated to America was made a freeman of the colony of Massachusetts, Nov. 2, 1637. The following year, as appears from the town records, a portion of land was set off for him in Charlestown, where he exercised the ministry. In April 1638, he was appointed one of a committee "to consider of some things tending toward a body of laws." These are the only particulars known of his life. His property at his death was worth about £1,600, one-half of which he gave for the erection of the institution which bears his name; but part of this bequest, it is said, was diverted from its original purpose. He also left to the college a library of more than 300 volumes, indicating in their selection the taste and skill of a scholar. A monument to his memory was erected in the burial ground of Charlestown by the alumni of the university, and inaugurated with an address by Edward Everett, 26 Sept. 1828. See HARVARD UNIVERSITY.

Harvard, Ill., a city and important railway junction in Chemung Township, McHenry County, at the intersection of three divisions of the Chicago & N. railroad, 63 miles northwest of Chicago. It has railroad repair shops, a malt house and brewery, manufactures

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of agricultural implements, wagons, and carriages, and grist and woolen mills. Pop. (1910) 3,008.

Harvard University, the oldest institution of learning in the United States, was founded in Cambridge, Mass., in 1636. At a meeting of the general court of the Colony of Massachusetts Bay, convened on 8 September, 6 years after its first settlement, it was voted to give £400 toward a "schoale or colledge," for the purpose of educating the "English and Indian youth in knowledge and Godliness." The ensuing year 12 of the eminent men of the colony, including John Winthrop and John Cotton, were authorized "to take order for a college at New Towne." The name Cambridge was adopted soon afterward in recognition of the English University where many of the colonists had been educated. In 1638 John Harvard, a young non-conformist minister, died in Charlestown, leaving to the college £750 and his entire library of 300 volumes. The institution was opened soon after and was named Harvard in honor of its first benefactor.

In 1637 the first building was erected. The first president was Rev. Henry Dunster, who was elected in 1640. The first graduating class was in 1642, and consisted of nine members. This same year a change was made in the government of the college; a board of trustees was created, the members of which were the governor, the deputy governor, the teaching elders of the "5 next adjoining towns"—Boston, Cambridge, Charlestown, Dorchester, and Roxbury—the magistrates, and the president of the college. The college was established as a corporation in 1650, with power of control over the educational and financial concerns of the institution. The members of the corporation were the president, the treasurer, and 5 fellows. In 1657 the corporation charter was changed so that the overseers had practically no control over the internal management of the college, although a final appeal might be made to them if necessary. Now there were two governing bodies; the overseers and the corporation, at times working in harmony and again antagonistic to each other. In 1780 the board of overseers consisted of the governor, lieutenant-governor, senate, and council of the commonwealth, the president of the college, and the ministers of the Congregationalist churches of the "6 adjoining towns" already mentioned. In 1810 a further change was made in the board of overseers, and instead of the senate and the ministers of certain churches, there were substituted 15 Congregationalist ministers, 15 laymen, the president of the senate, and the speaker of the house, all to be inhabitants of the State. The members constituting the senate were restored as overseers in 1814. A still further broadening of the spirit of the board was shown by the act of 1834, but not ratified until 1843, when clergymen of all denominations were made eligible for membership to the board, and in 1851 an act was passed in which no mention was made of clergymen, but the clause that made only inhabitants of the State eligible was retained. It was not until 1880 that Harvard was freed from all sectional lines, and non-residents of the State of Massachusetts became eligible for membership to the board of overseers.

During the 17th century Harvard had to con-

tend with serious obstacles, many of which had their origin in religious differences or shades of differences; but the desire to give the youth of Massachusetts an opportunity to learn the things taught to their fathers in the schools of Europe never faltered. It required heroic courage then to persevere in such a work, which at present seems a comparatively easy task. The religious controversies continued even after donations and endowments had come to the aid of the institution and had made its success seem almost certain. Under the presidency of Rev. Increase Mather, the college was placed under the control of the Calvinists (1692), but in 1707 the liberals gained the ascendancy. An English merchant, Thomas Hollis, in 1721, founded a chair of divinity, and directed that no religious test should be given to the candidate for the professorship. The gift was refused by the overseers, but the corporation urged its acceptance, and the latter finally prevailed. However, the first candidate for a professorship was really subjected to a religious test, for a confession of faith on various disputed points was exacted of him. The religious controversies were carried so far that at one time there was a strong effort made by the orthodox friends of learning to found another college in the colony; but Governor Bernard refused them a charter.

In 1764 the college met with a serious loss by fire; the first Harvard Hall, containing the library and apparatus, was entirely destroyed, but the loss was repaired to some extent by the generous aid of the Colonies. Harvard was loyal to the American cause during the Revolutionary period; even going so far in the readjustment of its financial affairs as to suffer considerable loss. The alumni and students have ever been patriotic, ready to contribute their best to the needs of their country. The fine building, Memorial Hall, was erected by the alumni in memory of their dead who fell in the Civil War. Harvard has always followed a conservative course when parties were agitating questions of government.

Between 1636 and 1782 Harvard College conferred only the degrees of bachelor and master of arts, but in 1780 the term university was applied to it in the Constitution of the State of Massachusetts. The class of 1768 evidently gave some attention to dress, as they voted to wear homespun at their graduating exercises, although their action on the matter is often quoted to prove their democratic simplicity. In 1782 and 1783 three professorships of medicine were established, and the first degree of bachelor of medicine was conferred in 1788. In 1810 the lectures in medicine were transferred to Boston, and there the first medical college was built. The law school was established in 1817, and it has the distinction of being the earliest school of law in the country connected with a university and authorized to confer degrees in law. The divinity school was a gradual outgrowth of the college; the Hollis professorship of divinity, which has been mentioned, was established in 1721, but the divinity faculty was not formally organized until 1819. It is now undenominational, no assent to the special doctrines of any sect or denomination of Christianity being required of any instructor or student. The schools of medicine, law and divinity are the three oldest additions to the college proper, and it was de-



THE YARD, HARVARD UNIVERSITY,
SHOWING UNIVERSITY, GRAY'S, MATTHEW'S, MASSACHUSETTS, AND HARVARD HALLS.

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HARVARD UNIVERSITY

cided that such an institution, having 4 schools and several departments, justified the title, university.

In about 1822, a number of the friends of education and of the institution thought the time had come when further changes should be made in the work required of the students. George Ticknor (q.v.), professor in the department of modern languages, urged that some division of studies should be made whereby students might be permitted to pursue special courses or specialize on certain subjects. A committee, with Joseph Story as chairman, was appointed to investigate the wisdom of such a change, and how best to meet the needs of the students. The committee reported (1824) the advisability of instituting two lines of study—the one a course necessary for a degree, the other a scientific and mechanical course for those not intending to take degrees, but who desired to fit themselves for certain departments of work. The departure from old customs as recommended by the committee was opposed by many, but in 1825 changes were made and the special students were admitted. Prof. Ticknor and later his successor, Henry W. Longfellow, introduced to some extent elective courses in the department of modern languages, but not until a number of years later did these courses become popular in other departments.

Charles William Eliot (q.v.) was elected president in 1869. At this time the departments were almost independent schools, to which no entrance examinations were required; but the students were largely from classical preparatory schools, the majority of which were located in New England. The college required certain courses, and all demanded good work and a high degree of scholarship before graduation. In four years practically a reorganization had been made, the departments had been correlated, and individual work had been given recognition. In 1909, Dr. Eliot retired and was succeeded by Dr. Abbott Lawrence Lowell, formerly professor of the science of government at the university.

To Harvard much credit is due for the conservative manner in which it has dealt with the question of higher education of women. The Society for the Collegiate Instruction of Women was the name of an organization which began the work (1869) of providing ways and means for giving young women an opportunity to obtain a collegiate education. The name of the organization was changed, in 1894, by the general court of Massachusetts to that of Radcliffe College (q.v.). Systematic collegiate instruction is now given in this college, under the professors and teachers of Harvard University. The requirements are the same as for admission to the university.

The various schools and departments of Harvard University now comprise: (1) Harvard College, the Lawrence Scientific School, and the Graduate School, established in 1872 for students making original research. The Scientific School was established in 1847 as an advanced school in science and literature; later the name was changed to Lawrence Scientific School, in honor of Abbott Lawrence who presented it with \$50,000. Those three schools, which include 14 departments offering elective courses, were placed, in 1890, under the charge of the faculty of arts and sciences. In 1910 there were in

attendance 2,265 students under the faculty of arts and science. Of this number 425 were in the graduate school and were engaged in original research. For the students of this school who are engaged in original investigations there is available a number of fellowships, at present 50, which are from \$200 to \$1,000. The Edward Austin Fellowship and the Austin Teaching Fellowship are given only to resident graduate students. Some of the fellowships may be given to persons pursuing their studies in other parts of the country or abroad: but non-resident appointments are given only to persons who have been resident students in some department of the university. (2) The law school has been mentioned. The attendance in 1910 was 756. (3) The divinity school, already noticed, has an attendance of 51. (4) The medical school, founded in 1782, and the dental school, established in 1867, were united in 1899 and are in charge of the faculty of medicine. The school is located in Boston. The attendance in 1910 was, in the medical school, 279; in the dental school, 87. The new buildings erected since 1903 for the accommodation of the medical departments are second to none other in the world. There are seven separate buildings, the central structure and two of the side pavilions are provided for by the gift of \$1,000,000 from J. Pierpont Morgan, and \$1,000,000 from other friends. The site comprises 26 acres, in Brookline, about three miles from the main buildings of the university in Cambridge. (5) The Bussey Institute, a school of agriculture and horticulture, was established in 1870 in accordance with the will of Benjamin Bussey. It is at Jamaica Plain, in the southwestern part of Boston. (6) The Arnold Arboretum, established in 1872, is devoted to scientific research in forestry, dendrology, and arboriculture. It was founded under the will of James Arnold. It is practically a large park containing about 220 acres, and is located in West Roxbury. (7) The astronomical observatory was established in 1843 by means of a public subscription. The Sears Tier was built in 1846, and two years later Edward Bromfield Phillips bequeathed to the university the sum of \$100,000 for the observatory; this early bequest has since been supplemented by many others, so that the observatory now has an endowment of about \$900,000. It has a director and four other professors and 40 assistants. A branch station is established on a mountain 8,000 feet high, near Arequipa, Peru. The annals of the observatory fill about 50 volumes. Among the more important instruments are the 15-inch and 6-inch equatorial telescopes, the 8-inch transit-circle, the 11-inch Draper photographic telescope, the 8-inch photographic telescope, and the meridian photometer. A special grant has recently been made by the Carnegie Institution, for the study of the collection of photographs at the Harvard Observatory. The amount of material, including photographs and photographic charts of the sky that has been collected in this department, requires a special building for its accommodation. (8) The university library, including the libraries of the schools and departments, contains about 855,000 volumes and 400,000 pamphlets. (9) The Gray Herbarium, so named because it contains the Herbarium of Asa Gray (q.v.), presented to the university in 1864. (10) The university museum is made up of the following collections:

HARVEST BUG — HARVEY

the Peabody Museum of American Archaeology and Ethnology; the Museum of Comparative Zoology, established in 1859 by private subscription, State aid, and the collection of Louis Agassiz, and valuable gifts from his son; the Mineralogical Museum, established in 1890-1; the Semitic Museum, completed in 1902; the William Hayes Fogg Art Museum, completed in 1895; and the Germanic Museum, established in 1902. (11) The botanical garden, established in 1809, covers about seven acres and contains thousands of plants for scientific study.

Great credit is due Harvard for its leadership in the movement to better the teaching of the English language and literature in the schools of the country. Harvard mentioned the subject in its catalogue of 1865-6; an announcement was made, in the catalogue of 1869-70, that "Students would be examined, as early as possible after their admission, in English." In 1874, for the first time, every applicant for admission to Harvard was required to present English composition. The report of the committee who visited the preparatory schools to ascertain what they were doing with the subject of English, the discussions by educators on the "new demands of Harvard," the progress of the movement, the grand results, all now are parts of the "History of Education" of America.

The university summer school gives short courses of study under the charge of a committee of the faculty of arts and sciences, and is held in the college buildings during the summer vacation. The school is popular and has had a large attendance each year. In 1910 the students numbered about 700. Athletics are provided for—two fields of 24 acres each and the Hemenway gymnasium furnish opportunities for physical training. The stadium erected on Soldiers' Field has a seating capacity of about 30,000. It is shaped like the letter "U," with the open space toward the Charles River. It is of steel and concrete construction. The mezzanine floor under the seats, the promenade above the seats, the stairs, the perfect arrangement of all the parts make this stadium a model of construction. It was built under the auspices of the class of '79. A club house, called the Harvard Union, was donated by Henry Lee Higginson in 1901. The Phillips Brooks house is used for religious meetings. In 1903 Harvard received a valuable collection of plaster replicas of Germanic art; a number of them were given by Emperor William II. of Germany. Among them is a replica of the equestrian statue of the Great Elector, by Schülter, one of Frederick the Great, by Schadow, a cast of the golden gate of the Cathedral of Freiburg, the bronze door of Hildesheim Cathedral, on which the Biblical story of Creation, the wood screen of Naumburg Cathedral, and several other reproductions of great value.

The university has now about 60 buildings. In 1910 the number of members of the corporation was 6; of overseers, 30; of professors and instructors composing the faculty, 618; of students in all the schools and departments, 4,046. In 1910 the invested funds of the university amounted to \$21,989,509; and the grounds, buildings, and apparatus were estimated to be worth about \$25,000,000; the annual income was \$2,015,711; and bequests and gifts amounted to

\$447,288. Harvard has had 23 presidents, including the present incumbent (1910), Abbott Lawrence Lowell. There are 13 periodicals which represents the interests of the university as a whole, and of special schools and departments.

Consult: Quincy 'The History of Harvard University'; Thayer, 'Historical Sketch of Harvard University'; Hill, 'Harvard College by an Oxonian'; Peabody, 'Harvard Graduates Whom I Have Known'; Bush, 'History of Harvard'; Eliot, 'A Sketch of the History of Harvard University'; Thayer, 'History of Middlesex County.'

Harvest Bug or Mite. See MITES.

Harvest-fish. See BUTTERFISH.

Harvest-fly. A cicada (q.v.).

Harvest-moon, the full moon nearest to the autumnal equinox, when the earth's satellite, almost full, rises for several nights in succession about the same hour. This phenomenon is less plainly seen in the United States than in higher latitudes, and is not met with in the tropics. It is due to the fact that at the time of the autumnal equinox the full moon, being exactly opposite the sun, is in that part of her orbit which makes a small angle with the horizon at the point of moon-rise.

Harvest Mouse. See MOUSE.

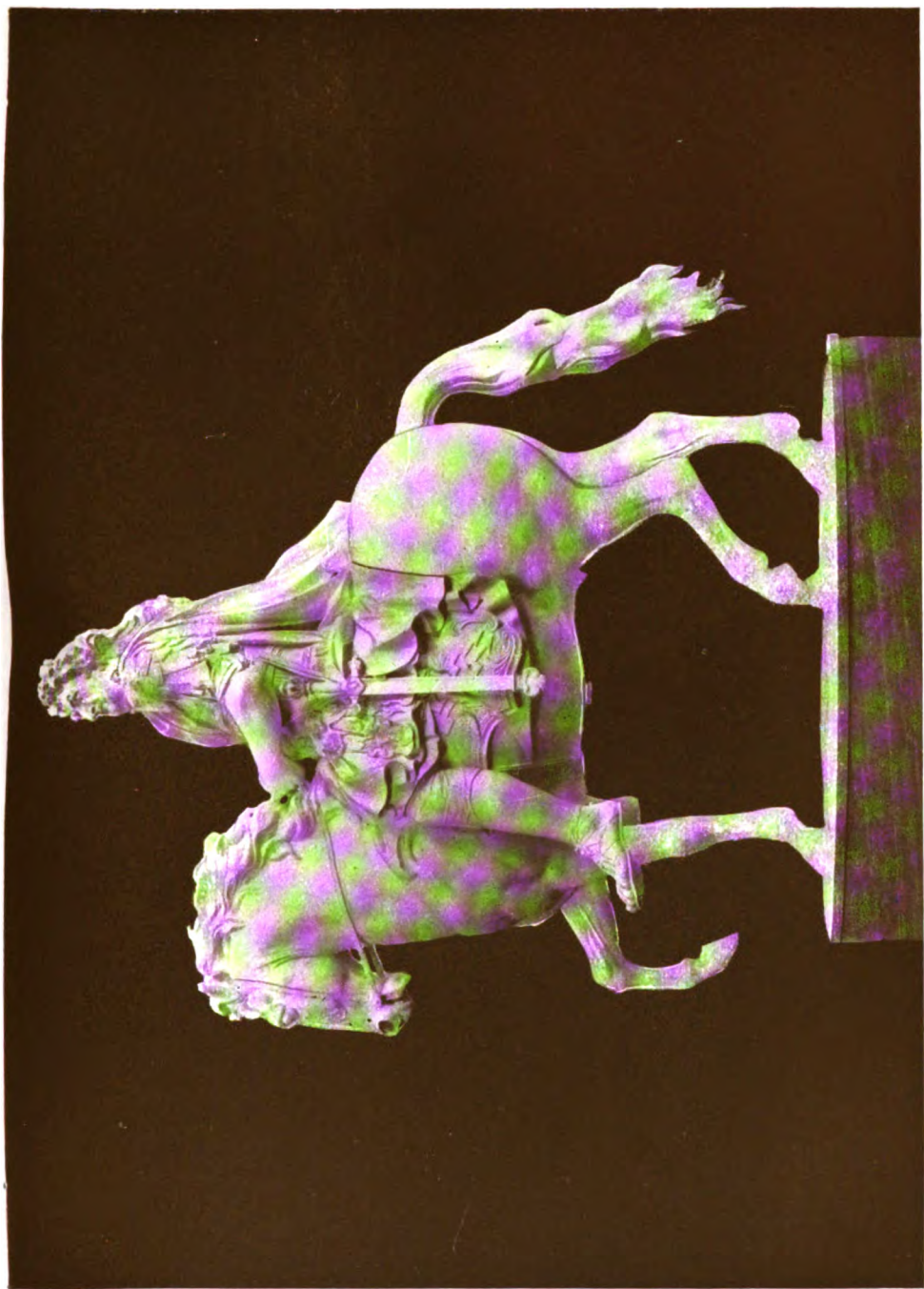
Harvestman, or Harvest Spider. See DADDY-LONGLEGS.

Harvey, George Rossiter McClellan, American publisher and editor: b. Peacham, Vt., 16 Feb. 1864. After a secondary education, he became a reporter successively for the Springfield (Mass.) *Republican*, the *Chicago News*, and the *New York World*, was for a time managing editor of the *World*, and later a constructor and president of various electric railways. He purchased and became editor of the 'North American Review' in 1899, and in 1900 received the presidency of the reorganized firm of Harper and Brothers, publishers.

Harvey, Moses, Newfoundland historian: b. Armagh, Ireland, 25 March 1820; d. St. John's, Newfoundland, 3 Sept. 1901. He was graduated at Queen's College, Belfast, in 1840; later studied theology; and was ordained in the Presbyterian Church. He was pastor of the Free Presbyterian Church, St. John's, Newfoundland, 1852-78, when he retired from the ministry and devoted himself to literary and scientific studies, and became popular as a lecturer. He published 'Thoughts on the Poetry and Literature of the Bible' (1853); 'Lectures on the Harmony of Science and Revelation' (1856); 'Newfoundland, the Oldest British Colony' (1883); 'Text-Book of Newfoundland History'; etc. He also contributed articles to the *Encyclopædia Britannica* on Newfoundland, St. John's, Labrador, and the seal fisheries of the world.

Harvey, William, English physician: b. Folkestone, Kent, April 1578; d. Hempstead, Essex, 3 June 1657; he was graduated at the University of Cambridge in 1593, and later at Padua. He is famous as the discoverer of the circulation of the blood.

Harvey, William Hope, American author: b. Buffalo, Putnam County, W. Va., 16 Aug. 1851. He was educated at Marshall College



THE GREAT ELECTOR,

THE STATUE PRESENTED BY EMPEROR WILLIAM II, TO HARVARD UNIVERSITY.

Univ. Library, UC Santa Cruz 2001

HARVEY — HASKELL

(W. Va.), and practised law in 1871-84. He appeared as an author under the pseudonym "Coin" in 'Coin's Financial School' (1894), in advocacy of bimetalism as a currency standard. Other works by him are: 'A Tale of Two Nations' (1894); 'Coin's Financial School Up to Date' (1895); 'Patriots of America' (1895); and 'Coin on Money, Trusts, and Imperialism' (1899).

Harvey, Ill., city in Cook County; on the Cleveland, C., C. & St. L. and the Illinois C. R.R.'s; south of Chicago, about seven miles from Blue Island. It was founded in 1891 and incorporated in 1892. Its proximity to Chicago gives it the advantages of a residential city and its railroad facilities are an aid in the development of its manufactories. Some of the chief industrial establishments are railroad supply shops, an automobile factory, gas-stove factories, machine-shops, in which are manufactured ditching and mining machinery. The trade is principally in its manufactures and agricultural products. Pop. (1910) 7,227.

Harveyized Steel. See STEEL.

Harwood, Andrew Allen, American naval officer: b. Settle, Pa., 1802; d. Marion, Mass., 28 Aug. 1884. He was a great-grandson of Benjamin Franklin (q.v.). In 1818 he entered the navy and served in the suppressing of the slave trade and piracy in the West Indies; in 1835-7 was with the Mediterranean squadron; in 1848 was given the command of the Cumberland, and in 1855 promoted to the rank of captain. In 1862 he was appointed chief of the bureau of ordnance and hydrography; in 1863 he was made commandant of the Washington navy yard and Potomac flotilla, having the rank of commodore, and retired in 1869 with the rank of rear-admiral. He published 'Law and Practice of United States Navy Courts-Martial' (1867), and 'Summary Courts-Martial.'

Harz (härts) Mountain (Ger. *Harsgebirge*), the northernmost mountain range of Germany, extending about 60 miles through Prussia, Brunswick, and Anhalt, between the rivers Weser and Elbe, and occupying an area of about 786 square miles. The range, composed chiefly of Devonian and Lower Carboniferous formations, broken through with granite, is divided into the Upper and Lower Harz, with average elevations of 2,100 and 1,000 feet, respectively, the maximum altitude, 3,745 feet, being reached in the Brocken (q.v.). Woods and fine pastures abound; silver, iron, lead, copper, and zinc are mined, and marble, alabaster, and granite quarried. Traversed by fine roads and accessible by railroads, the range is a favorite touring ground, its interest enhanced by the traditions and weird legends which had their birth in this romantic region.

Has'call, Milo Smith, American soldier: b. Le Roy, Genesee County, N. Y., 5 Aug. 1829; d. Oak Park, Ill., 30 Aug. 1904. He was graduated from West Point in 1852, resigned from the army, practised law in Indiana, entered the Federal army as a private at the outbreak of the Civil War, rose to the grade of brigadier-general of volunteers, distinguished himself at the battle of Stone River, where he saved the day; was present at the siege of Atlanta, and resigned his commission in 1864.

Subsequently he was a banker at Goshen, Ind., and a real estate dealer in Chicago.

Hasdrubal, hās'droo-bal, Carthaginian general. He was the son of Hamilcar Barca, and brother of Hannibal (q.v.), and, on the departure of the latter for Italy 218 B.C., was left in command of the army in Spain. Hanno, who had charge of the province north of the Iberus, was defeated and dispossessed by Cn. Scipio before Hasdrubal could come to his aid. Scipio, reinforced by his brother, now crossed the Iberus, and in 216 defeated Hasdrubal near that river. The Carthaginians then sent a force, intended for the assistance of Hannibal, to the relief of Hasdrubal under the command of his brother Mago. In 212 Cn. Scipio was defeated and killed by the Carthaginians. Publius Scipio was sent into Spain in 211, and after seizing New Carthage defeated Hasdrubal in his camp at Bæcula in 209. Hasdrubal withdrawing to the northern provinces, determined to proceed to Italy, leaving his colleagues, Hasdrubal, the son of Gisco, and Mago, to make head against Scipio. He crossed the Alps in 207, accompanied by Gallic allies, and descended into Italy, and sent messengers to concert a junction with Hannibal in Umbria, but his despatches fell into the hands of the consul, Claudius Nero, who joined his colleague, M. Livius, at Sena, and forced Hasdrubal to give battle on the right bank of the Metaurus. Being outnumbered, and ill-supported by his Gallic allies, he was defeated, after an obstinate engagement, in which both sides suffered severely. When he saw the battle irretrievably lost, he rushed into the midst of the enemy, and perished fighting sword in hand. Nero hastened back to Apulia, and is said to have announced to Hannibal the defeat of his brother by causing Hasdrubal's head to be thrown into his camp, 207 B.C.

Haseltine, hā'zēl-tīn, **William Stanley**, American artist: b. Philadelphia, 11 Jan. 1835; d. 1900. He was graduated from Harvard in 1854, studied art in Düsseldorf and Rome, and was a member of the National Academy from 1861. Among paintings by him may be named 'Indian Rock, Nahant'; 'Castle Rock, Nahant'; 'Bay of Naples'; 'Ruins of a Roman Theatre.'

Hashish, hāsh'ēsh, an eastern narcotic preparation, made from the tops and tender parts of the cultivated hemp, the variety known as *Cannabis Indica* being chiefly employed. The resin picked from the hemp is kneaded together, or sometimes the drug is obtained by decoction or infusion of the leaves. The resin is taken in the form of pills or pellets, and the leaves are chewed, or smoked in conjunction with tobacco. It is called *bang* in India, where it is mixed with sugar and eaten as confectionery. It is as powerful as opium and produces intoxication and hallucinations; sometimes transporting the hashish-eater into an ecstasy, or lulling him into somnolency or torpor. Its after-effects are not so depressing as those of opium, and it is often prescribed medicinally as a soporific or anti-spasmodic.

Haskell, Edwin Bradbury, American publisher and editor: b. Livermore, Maine, 24 Aug. 1837; d. Boston, Mass., 25 March 1907. He entered the office of the Portland (Maine) *Advertiser* in 1854, was a reporter for the *Journal* (1857-60) and *Herald* of Boston, bought an

HASKELL INSTITUTE—HASTINGS

interest in the *Herald* in 1865, and was editor of that paper 1862-87. Mr. Haskell also held an interest in the *Minneapolis Journal*, the *St. Joseph (Mo.) News*, and the *Los Angeles Express*.

Haskell Institute. See INDIAN, EDUCATION OF.

Has'kins, Charles Homer, American historical scholar: b. Meadville, Pa., 21 Dec. 1870. He was graduated from the Johns Hopkins University in 1887, studied also at Paris and Berlin, was instructor in history at Johns Hopkins in 1889-90, and in the University of Wisconsin was successively instructor in history (1890-1), assistant-professor (1891-2), and professor of European history (1892-1902). In 1899-1900 he was a lecturer in history at Harvard, and in 1902 was appointed professor of history there.

Has'sall, Arthur, English historian: b. Bebington, Cheshire, England, 28 Sept. 1853. He was educated at Oxford, where he has been at various times since lecturer, tutor, and examiner. He is one of the recognized authorities upon European history, his published books including 'Life of Bolingbroke' (1889); 'Louis XIV.' (1895); 'Handbook of European History' (1897); 'The Balance of Power 1715-80' (1896); 'Class-book of English History' (1901); 'History of France' (1901); 'The French People' (1901).

Has'sam, Childs, American artist: b. Boston 1859. He studied art in Boston and Paris; he is a member of Ten American Painters, of New York, and of the Société Nationale des Beaux Arts of Paris. He is one of the freshest in style and most original of the American impressionists, and has gained medals at Paris, Munich, Chicago, and Philadelphia.

Hassen Ben Sabbah, the founder of the sect of the Assassins (q.v.).

Hasselquist, hās'sēl-kwist, Frederick, Swedish naturalist: b. Ostrogöthia 1722; d. Smyrna 9 Feb. 1752. In 1741 he went to the University of Upsala, where his talents and industry drew the attention of Linnæus. In 1747 he published a dissertation 'De Viribus Plantarum.' Wishing to make researches on the spot into the natural history of Palestine he spent some time at Jerusalem, and afterward visited other parts of the country. Returning to Smyrna he brought with him a collection of plants, minerals, fishes, reptiles, insects, and other natural curiosities. The Swedish queen, Louisa Ulrica, purchased the whole of Hasselquist's acquisitions, which were deposited in the castle of Drottningholm. Linnæus, from the papers and specimens of natural history collected by his pupil, prepared for the press the 'Iter Palæstinum, or Travels in Palestine, with Remarks on its Natural History' (1757), which has been translated into English and other European languages.

Hassler, hās'lēr, Ferdinand Rudolph, Swiss-American scientist: b. Switzerland, 6 Oct. 1770; d. Philadelphia, Pa., 20 Nov. 1843. After serving on the trigonometrical survey of Switzerland, he emigrated to the United States. He was appointed acting professor of mathematics at West Point in 1807, and held the post for three years. He was superintendent of the United States Coast Survey in 1815, and from

1832 worked on the same commission until his death.

Hässler Expedition, a scientific expedition of great importance despatched by the United States Government. In 1871 the steamship Hassler was fitted out for coast survey and marine exploration. The personnel of the expedition included Prof. Louis Agassiz, and Mrs. Agassiz; Dr. F. Steindacher, ichthyologist; Dr. Thomas Hill, botanist; Count L. F. de Pourtales, Mr. J. A. Allen, and others. The party left Boston 4 Dec. 1871 and reached San Francisco, August 1872. Deep-sea dredging was carried on at several points in the West Indies and South Atlantic. The glaciers in the neighborhood of the Straits of Magellan were explored. Collections were made at every point of the voyage; the results of the expedition have been published by Agassiz, Lyman, and Pourtales, and much valuable material, zoological, geological and botanical, deposited in the Museum of Comparative Zoology, Cambridge.

Hastings, hās'tingz, Francis Rawdon, 1ST MARQUIS OF HASTINGS and 2D EARL OF MOIRA, English soldier and statesman: b. 9 Dec. 1754; d. off Naples 26 Nov. 1826. He entered the army as an ensign, served in America during the Revolution, and on 25 April 1781 gained the battle of Hobkirk's Hill, which Lord Cornwallis described as the most splendid of the war. In 1781 he was elected a member of the Irish House of Commons, and two years later he was promoted to the English House of Lords with the title of baron. He was in command of a force which sought to aid the royalists of Brittany in 1793, and in the following year co-operated with the Duke of York in the Netherlands. In 1812 he was appointed governor-general of Bengal and commander-in-chief of the forces in India. His administration was distinguished by successful wars against the Ghurkhas of Nepaul and the Pindarees of Central India, but in 1821 he resigned because certain charges had been brought against him in connection with a banking firm in which he was interested. In 1824 he was appointed governor of Malta.

Hastings, Thomas, American musician: b. Washington, Conn., 1787; d. 1872. He early made sacred music the subject of his careful study; from 1823 to 1832 he edited a religious paper, 'The Recorder,' in Utica, but removed to New York, where he made his fame as a musical instructor and composer. His works include: 'Mother's Hymn Book' (1840); 'History of Forty Choirs' (1854); and 'Dissertation on Musical Taste' (1853).

Hastings, Warren, English soldier and administrator: b. Churchill, Oxfordshire, 6 Dec. 1732; d. Daylesford, Warwickshire, 22 Aug. 1818. An uncle in London sent him at 10 years of age to Westminster School. On the death of his uncle he obtained an appointment in the East India Company's service, and he arrived at Bengal in October 1750. He was appointed to the factory at Cossimbazar, and was taken prisoner by Surajah Dowlah (1756). On obtaining his freedom he joined Clive, under whom he served with distinction as a volunteer in his campaign of 1757. In 1758 he was appointed resident agent of the company at Moorshedabad, in which capacity he continued to act till 1761. It is recorded to his honor that he did not avail

HASTINGS

himself of the opportunity of making his fortune in the mode then common among the servants of the company, by "presents" (forced) from the native princes. In 1764 he returned to England, but as a result of a bad investment of his fortune was compelled again to ask for employment from the company; and sailed for India in the spring of 1769. In 1771 the East India Company were contemplating extensive changes in the government of India. The government of Bengal was still carried on in the name of the nabob, although he had become a mere cipher, all his officers being appointed by the company, and they cast their eyes upon Warren Hastings as a fitting instrument to carry out their policy. Clive strenuously supported his appointment to the Calcutta council (1772), with succession as president of the council and governor of Bengal. He now received instructions from the directors to deprive of his offices Mohammed Reza Khan, who had exercised under the company the complete control of the revenues and administration of Bengal, and to bring him to trial for corruption. Mohammed bore a high character, and he was accused by Nuncomar, a man of notoriously bad reputation. Shitab Roy, dewan of Behar, was subjected to similar charges. After a protracted inquiry both Mohammed and Shitab were fully acquitted of all the charges against them. The object of these charges — the reorganization of the judicial and financial administration of the province under the direct control of the company's officers, had in the meantime been carried out by Hastings to the entire satisfaction of the directors. Another important step taken by him was to enter into a treaty with the Nabob of Oude (Treaty of Benares, 7 Sept. 1773), by which he ceded to him the districts of Corah and Allahabad for fifty lacs of rupees, and engaged to hire out the company's troops to him for the reduction of the Rohillas, whose territory the nabob coveted. By the subsequent act of 1773, Hastings was appointed first governor-general of India, and a supreme council was named, of whom three formed a majority unfavorable to Hastings. The natives were encouraged to bring charges against him, and Nuncomar, his old ally, came forward with various charges of bribery. A supreme court of justice had been appointed at the same time with the supreme council of Calcutta. The chief-justice, Sir Elijah Impey, its head, was a friend of Hastings. Nuncomar was brought before this court, charged with forgery, convicted, and executed. This stretch of jurisdiction, which Hastings could easily have prevented, alienated from him public sympathy in England. The directors of the company petitioned the crown on 8 May 1776 for his removal from the council. Hastings had deputed Colonel MacLean, who returned to England in 1776 to insist on certain conditions or tender his resignation. It was accepted, and a successor appointed to take his place in the council, 23 Oct. 1776. General Clavering assumed the title of governor-general, which Hastings still insisted on retaining, as the change had been made without the conditions he had appended to his resignation. The supreme court, which was appealed to, decided in favor of Hastings. To end a dispute between the council and the supreme court of Calcutta, and to bring the chief-justice under the influence of the council, Hastings now appointed Sir Elijah Impey superintendent of the native courts

with a salary of £8,000 a year, an appointment regarded by some as equivalent to a bribe. He involved himself in disputes with the Madras government, made demands for a large war contribution upon the Rajah of Benares, and when the rajah resisted arrested and deposed him. He caused the "begums of Oude," mother and grandmother of the Nabob of Oude, to give up extensive estates in land and a large amount of treasure. The House of Commons had passed a resolution (30 May 1782) requiring the directors to pursue all legal and effectual means for his removal. In November 1784 he resigned his post, and in February 1785 left India. In 1786 articles of impeachment were brought in by Burke against him. The preliminary forms were gone through from 13 to 14 February, and Burke opened the charges against him in a speech of three days' duration, begun on the 15th. He was supported by Fox, Sheridan, and Grey. Hastings began his defense on 2 June 1791, and on 17 April 1795 was acquitted by large majorities on all the charges. His acquittal met with general approval. The legal expenses of his trial amounted to £76,080. The company in 1796 settled on him an annuity of £4,000 a year for 28½ years, and lent him £50,000 for 18 years free of interest. He passed the remainder of his life in retirement. In 1813 he received the degree of LL.D. from the University of Oxford, and in 1814 was created a privy-councillor.

Hastings, Mich., city, county-seat of Barry County; on the Thornapple River, and on the Chicago, K. & S. and the Michigan C. R.R.'s; about 38 miles west by south of Lansing and 32 miles southeast of Grand Rapids. The city is in a fertile agricultural region. The chief manufactures are furniture, pumps, wagons and carriages, hose-reels, car-seats, flour, cigars, felt boots and lumber camp supplies. The principal buildings are the library, the city hall, jail and courthouse. The city owns and operates the waterworks. Pop. (1910) 4,383.

Hastings, Minn., city, county-seat of Dakota County; on the Mississippi River at the mouth of the Vermilion River, and on the Chicago, M. & S. P. railroad; about 15 miles southeast of Saint Paul. Its chief industrial establishments are breweries, a malt-house, flour-mills, grain-elevators, saw- and planing-mills, sash, door, and blind factories, carriage and wagon factories, furniture factories, lumber and brick yards. In addition to the trade in manufactured articles, grain, lumber, and live stock are among the important shipments. Pop. (1910) 3,983.

Hastings, Neb., city in Adams County; on the Missouri P., the Burlington & M., the Fremont, E. & M. V., the Saint J. & G. I. R.R.'s; about 25 miles south of Grand Island and 95 miles west of Lincoln. Its first settlers were Eastern people who availed themselves of the benefits of the government "Homestead Act," but the city was not incorporated until 1874. It is in a fertile agricultural section. The chief manufactures are flour, wagons, and agricultural implements. The trade is principally in wheat, corn, and live stock. It is the seat of Hastings College, under the auspices of the Presbyterian Church, and opened in 1882, and of the State asylum for chronic insane. The government is vested in a mayor, who holds office two years,

HASTINGS-UPON-HUDSON — HATCHER'S RUN

and in a city council. The present charter is that of 1891. The city owns and operates the electric light plant and the waterworks. Pop. (1910) 9,338.

Hastings-upon-Hudson, N. Y., village in the town of Greensburg, in Westchester County; on the Hudson River, and the New York Central & H. R. railroad; about three miles north of Yonkers and 20 miles from New York. It is largely a residential village; but in the vicinity are marble quarries which add to the industrial wealth of the place. It has some manufactures, chiefly chemicals and cigars; it has a large trade in coal and lumber. It is the seat of the Hastings Commercial and Collegiate Institute, and has several churches and good schools. Pop. (1910) 4,552.

Hastings, Battle of. See SENLAC.

Has'well, Charles Haynes, American engineer: b. New York 22 May 1809; d. 12 May 1907. His practical education as marine and mechanical engineer was learned in a steam-engine factory. In 1836 he was appointed chief engineer in the United States navy. He built the first practical steam-launch in 1837 and was the first to use zinc to protect the hulls of iron vessels and boilers from the galvanic action of salt water and copper. After 1898 he was the consulting engineer of the board of public improvements in New York city. His published works include 'The Mechanics' and Engineers' Pocket Book' (1901); 'Mechanics' Tables' (1854); 'Reminiscences of an Octogenarian' (1895).

Hatch, John Porter, American general: b. Oswego, N. Y., 29 Jan. 1822; d. 12 April 1901. He was graduated at West Point and rose through successive grades to lieutenant-colonel of cavalry in 1873. He served in the Mexican War from Palo Alto to the capture of the city of Mexico; and in the Civil War was appointed brigadier-general of volunteers in September 1861, and commanded a cavalry brigade in the Shenandoah Valley and Northern Virginia. He subsequently commanded various districts in the South; and was brevetted major-general.

Hatch, Rufus, American banker: b. Wells, York County, Maine, 1832; d. 1893. He began life as clerk in a grocery store, in Rockford, Ill., in 1854 entered the grain commission business in Chicago, and amassed a fortune. He managed the Chicago and Northwestern railroad combination in 1868 and made a financial failure in the Northern Pacific collapse of 1883.

Hatch, William Henry, American lawyer: b. Georgetown, Ky., 1833; d. 1896. He was admitted to the bar in 1854; served through the Civil War in the Confederate army, and was a member from Missouri in the United States House of Representatives from 1879 to 1895. The Hatch Act which distributed Federal aid to agricultural experiment stations in all the States and Territories was inspired by him.

Hatchee, or **Big Hatchee**, a river which has its rise in the northeastern part of the State of Mississippi, flows north by west into Tennessee, then northwest and west joining the Mississippi River about 30 miles in direct line above Memphis. It is navigable for small steamboats as far as Bolivar, about 100 miles from its mouth, or half its whole length. The area drained by the Hatchee, about 4,000 square miles, is excellent cotton land.

Hatcher's Run (BOYDTON ROAD), Battle of. On 27 Oct. 1864, Gen. Grant, with the intention to extend his lines to the South Side railroad, and under the belief that the Confederate works around Petersburg extended only to the Boydton road crossing of Hatcher's Run, and were but feebly manned, moved parts of the Ninth, Fifth, and Second corps, together with Gregg's cavalry division, in all about 38,000 men, in three columns to the left. Gen. Parke, commanding the Ninth corps, moving to surprise the right of the Confederate works, found them strongly held, and made no attack. The Fifth corps, on the left of the Ninth, crossed Hatcher's Run and endeavored to seize the bridge by which the Boydton road crossed that stream, and was repulsed. The Second corps and Gregg's cavalry succeeded in forcing a passage over Hatcher's Run by the Vaughan road, and reaching the Boydton road, moved down it to Burgess' Tavern, near the bridge over Hatcher's Run, some four miles above Armstrong's Mill, where the infantry was checked. Hancock's Second corps having effected the passage of Hatcher's Run, by the Vaughan road, Warren was ordered to cross Crawford's division of the Fifth corps at Armstrong's Mill and, sweeping up the right bank of the stream, endeavor to recross and assault the Confederate line in the rear, while Griffin's division assaulted in front. Hancock was advised of the orders given Warren and authorized to make the attempt to carry the bridge in his front and gain some high ground beyond. At 4.30 p.m., when Hancock was extending his right to connect with Crawford, and was about to assault the bridge, Gen. Heth, with his own division and a part of Mahone's, having crossed Hatcher's Run and penetrated the interval between Hancock and Crawford, vigorously attacked Hancock's right and rear, throwing it into some confusion and capturing many prisoners, but Heth was finally repulsed. At about the same time Hampton, with five cavalry brigades, attacked Hancock's left and rear and Gregg's cavalry, but was repulsed. Crawford, who had crossed at Armstrong's Mill, found great difficulty in moving up the bank of Hatcher's Run, and failed to make connection with Hancock. The object of the entire movement failed, with Hancock still six miles from the South Side railroad. The Union troops were withdrawn during the night and, next day, moved back to the line of entrenchments. The Union loss, the greater part of which fell upon the Second corps, was 1,194 killed and wounded, and 564 missing. The Confederate loss is unknown. Consult: 'Official Records,' Vol. XLII.; Humphreys, 'The Virginia Campaign of 1864-5'; Walker, 'History of the Second Army Corps'; The Century Company's 'Battles and Leaders of the Civil War,' Vol. IV.

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Hatcher's Run (DABNEY'S MILL and ARMSTRONG'S MILL), Battle of. It was on 5 Feb. 1865 that Gen. Grant put in motion an expedition to interrupt the Confederate line of communication by the Boydton road, running through Dinwiddie Court House to Petersburg. Gregg's cavalry division was directed to march early in the morning by way of Ream's Station to Dinwiddie Court House and strike the road; Warren's Fifth corps was to cross Hatcher's Run and support Gregg; Gen. Humphreys, command-

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ing the Second corps, was ordered with two divisions to the crossing of the Vaughan road over the Run, and to Armstrong's Mill, to hold these two points and to keep up communication with Warren, four miles distant, on the one side, and with Miles' division in the Union entrenchments, three or four miles distant, on the other side. After severe skirmishing, Humphreys pushed Motts' division to the south side of Hatcher's Run, and established Smyth's division at Armstrong's Mill on the north side, about 1,000 yards from the Confederate works, where two brigades were brought to Smyth's support. At 5 P.M. parts of A. P. Hill's and Gordon's corps came out of their works and, under cover of the woods, attacked Smyth, but were repulsed. Smyth's line was now further strengthened by Hartranft's division of the Ninth corps and Wheaton's of the Sixth. Gregg captured some wagons and prisoners on the Boydton road, and in the evening fell back to Malone's Bridge on Rowanty Creek, from which he moved up to the Vaughan road crossing, where he arrived early in the morning of the 6th, with Warren, who had been ordered to support Humphreys. About 1 P.M. Warren, with two divisions, moved along the Vaughan and Dabney's Mill roads; Gregg, supported by one of Warren's divisions, going down the Vaughan road to Gravelly Run to observe the left. Gregg was attacked by a part of Pegram's division, but held his ground and, with the support given him by part of Griffin's division, drove Pegram's men back. Warren's leading division (Crawford's) moving on the Dabney's Mill road, also encountered part of Pegram's division, which was forced back to Dabney's Mill, where Evans' division came to Pegram's support, and Crawford in turn was driven back. Three Union brigades were now brought up to Crawford's support and, at the same time, Mahone's division arrived and took position between Evans and Pegram, and the whole Confederate line advanced, driving Warren back in great disorder, but some of his men rallied upon Wheaton's division, which had crossed from the north bank of the stream, and the Confederates were checked. On the morning of the 7th Warren made a reconnaissance, but did not find the enemy in force. The Union works were now extended to Hatcher's Run at the Vaughan road crossing. The Union loss was 1,352 killed and wounded, and 187 missing. The Confederate loss was about 1,500, among the killed being Gen. John Pegram. Consult: 'Official Records,' Vol. XLVI.; Humphreys, 'The Virginia Campaign of 1864-5'; Walker, 'History of the Second Army Corps'; Powell, 'History of the Fifth Army Corps.'

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Hatch'ettite, *Adipocerite*, or *Mineral Adipocere*, a native hydrocarbon, probably of the nature of a paraffin, occurring in certain parts of England and Scotland, mainly in connection with bogs and coal measures. It is wax-like, and melts at about 115° F. The specific gravity of the natural mineral is about 0.61, but after melting the specific gravity rises to 0.92 or even higher, owing to the elimination of air bubbles. Hatchettite is without odor, and when fresh it is commonly translucent and yellowish. Upon exposure, however, it blackens and becomes opaque.

Hatchie River, or Davis' Bridge, Battle of. After Gen. Van Dorn's defeat at Corinth, Miss., 4 Oct. 1862, he retreated and bivouacked for the night at Chewalla. Early on the morning of the 5th he continued his retreat on Pocahontas, but when his advance had crossed Hatchie River, at Davis' Bridge, he was met by Gen. Hurlbut's division, which had been sent by Gen. Grant from Bolivar, Tenn., to Pocahontas to intercept his retreat. Van Dorn's advance was driven back across the bridge, his main body came up, and Gen. Ord, who had arrived on the field from Jackson, took command of Hurlbut's division and attacked Van Dorn vigorously. A severe engagement ensued, in which Ord was severely wounded, and Hurlbut resumed command of the Union troops. Van Dorn, not closely followed from Corinth by Rosecrans, who was 12 miles away, held his position before Hurlbut the greater part of the day and, cut off from his route through Pocahontas, continued his retreat on the east bank of the Hatchie for six miles to Crum's Mill, where he crossed his army on a bridge during the night and continued his retreat to Ripley and thence to Holly Springs. Rosecrans followed as far as Ripley, when Grant ordered him to return to Corinth and Hurlbut to Bolivar. See CORINTH, ADVANCE ON AND BATTLE OF.

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Hatch'ment (a corruption of achievement, coat of arms) a funeral escutcheon, the arms of a deceased person within a black lozenge-shaped frame meant to be placed on the front of his home. If the deceased was unmarried or a widower or widow, the whole field of the escutcheon is black. In the hatchment of a married person the arms of husband and wife are impaled, and only that part is black which adjoins the side of it occupied by the arms of the deceased. Thus, in the hatchment of a husband the dexter side is black, the sinister white; in that of the wife the reverse. In a bishop's hatchment his arms being impaled with that of the see, those of the see have a white background. When the deceased is the last of his race a skull is set above the shield in place of a crest.

Hat'field, James Taft, American German scholar: b. Brooklyn, N. Y., 15 June 1862. He was graduated from the Northwestern University in 1883, from the Johns Hopkins University in 1890; was appointed professor of German language and literature at Northwestern in 1890, and became contributing editor of 'Americana Germanica.' During the Spanish-American War he served from seaman to chief yeoman on board the cruiser Yale. His publications include 'Materials for German Composition' (1896), editions of Freytag's 'Rittmeister von Alt-Rosen' and Goethe's 'Hermann und Dorothea,' and various articles and monographs on subjects of German literature.

Hath'amite, an explosive invented in 1902 by G. M. Hathaway, of Wellsboro, Pa., and remarkable not only for the enormous energy liberated by its explosion, but also for the safety with which the substance may be handled. Hathamite may be pulverized on an anvil with a sledge hammer without exploding, and rifle balls may be fired through it without effect. Lighted matches may also be thrown into it with impunity, and when poured upon a fire it burns

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quietly, with the evolution of immense quantities of smoke. Apparently, explosion can be induced only through the agency of a dynamite percussion cap. Hathamite is a coarse powder, of a bluish-gray color, whose composition has not yet been divulged. It explodes with exceeding violence when fired with a suitable percussion cap. In one test a charge of an ounce and a half blew a two-inch hole through a piece of quarter-inch boiler plate, when merely laid upon the plate, and detonated in the open air. In another test a little over eight ounces of the explosive was actually melted and poured into a six-pound shell; and when the charge was afterward detonated, the shell was thoroughly fragmented. One marked advantage of hathamite is, that it will explode even when frozen.

Hathaway, Anne, the wife of Shakespeare. See SHAKESPEARE.

Hats and Hat-making. It is difficult to state just when hats were first worn, but it is a fact that fur-felt hats now form part of the attire of civilized man the world over. There is no record as to when or where the first hat was made. We find head covering in one form or another in vogue in the earliest times referred to in history. The first modern hat, as we now know this article of men's wear, was made in Paris about 1404 by a Swiss manufacturer, but it was not until 49 years afterwards that the French adopted any sort of a head covering. Charles XII., upon his entry in triumph into the city of Rouen in 1453, wore a huge hat made of fur, lined with red velvet, from which protruded a great feather. With royalty as its sponsor the hat at once became a necessary detail of man's wardrobe. The hat is distinguished from the cap or bonnet by its continuous brim. It has been traced back to the "petasus" of ancient Greece, just as the cap has been regarded as the descendant of the brimless "Pileus," also a form of Grecian head attire. These articles, as far as we know, were made almost exclusively of felt.

Felt hats became popular in England during the Norman occupation. In Queen Elizabeth's reign great beaver hats, usually black, were the favorite among the nobility, and they remained in vogue for more than 300 years. About the middle of the 17th century an effort was made to encourage this industry in America. In 1662 the assembly of Virginia, to stimulate activity among the colonists, offered, by special enactment, to give 10 pounds of tobacco for every good wool or fur hat produced in that colony from materials taken from animals native thereto. Hats were then made by hand, and no effort of any consequence was made to improve the primitive conditions until 1820, when the energy of the American inventor produced the first labor-saving machine. Improvement now followed improvement, each one, in its way, tending to economize the cost of making.

In 1810 the silk hat appeared. It was made by hand, and failed in its purpose to supplant the tilled beaver. It was not until 1830 that the silk plush hat was manufactured upon a paying basis.

In 1840 the soft felt hat made its bow in the United States. Its sponsor was the famous Hungarian patriot, Kossuth, who visited America in that year. He was given tremendous receptions everywhere, and won the heart of the great American republic. His great hat seemed to be

typical of the vigorous character of the man, and it was not surprising that the "Kossuth" became a general favorite. From that time the soft hat has steadily gained friends, and to-day in many sections it is a predominant type.

While the industry in this country, prior to the Civil War, kept pace with progress in other lines, it was not able to hat the heads of thousands of Americans, and the foreign manufacturer found the States a very profitable territory. But to-day America has become a great exporter of hats. By far the largest share of this foreign trade is controlled by the city of Philadelphia, where the finest grades of hats in the world are made. The other well-known hat centres in America are Orange and Newark, N. J., Danbury, Bethel, and Norwalk, Conn., Brooklyn, N. Y., and Reading, Pa.

The kinds of hats now made are so numerous as to be almost beyond the possibility of listing. There are, however, three principal classifications: the felt hat, which includes the soft and the stiff or derby shape, the silk hat, and the straw hat. All other kinds are but variations in some way of these three. In this article the writer will deal exclusively with the felt hat, concerning which there is the greatest interest. But few people have any conception of the numerous perplexing details and methods which enter into the construction of the hat.

The furs most generally used in manufacturing felt hats are the beaver, which is found in the northwestern part of the United States and Canada; the coypou or nutria, known as the South American beaver; the Saxony and the Russian hare; the Scotch, English and French coney, and muskrats. The finest furs are taken from the nutria, beaver and otter, all water animals, that portion which is taken from the belly being regarded as the choicest. The others are land animals, the fur from the back being regarded as the best. In the more common grades of hats sheep's wool is used, while in the inferior grades wool is mixed with cotton and other vegetable fibres. These, however, cannot be properly termed felt hats, because the materials used are not felted together. They are cemented and are then stiffened by shellac.

Furs for the higher grade hats require the most exhaustive preparation. Upon their arrival at the factory the pelts are first washed with whale-oil soap to remove the superficial fatty matter which clings to the fur. A further purification is necessary, however, and for this purpose "carrotting" is employed. A solution of mercury and nitric acid is applied to the pelts. This chemical, deposited in the cellular tissues, absorbs and thoroughly destroys all animal fats and gives to the fur its felting properties.

After a thorough brushing the fur is next cut from the pelts and is then stored away to mellow and season, for the reason that, like good wine, it strengthens and improves with age. When these furs have become properly seasoned, and are in prime condition, they are subjected to an interesting process for the purpose of removing the hair; a machine, known as a "blower," containing powerful air blasts, accomplishes this work in a very thorough manner. The hair is blown from the fur without harming the latter. This is repeated over and over again, until all foreign matter has been removed. The by-products obtained through these preliminary opera-

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tions are extensive. Many of them are used for other purposes than hatting; for instance, the shreds of the skins are used in the manufacture of the highest grades of glue.

The task of selecting the furs and of combining them in proper proportion to produce the best results in a high-grade hat demands the most careful attention of the experienced experts. Many years of experiment have been necessary, in order to learn just how these furs should be mixed, and just what would constitute the correct proportion. The strength and perfection, as well as the beauty of the completed hat, depend largely upon the efforts of those intrusted with this portion of the work.

The next stage in the life of the hat is the forming. Until recently this was a business in itself. Few hat-making firms engaged in it. To-day, however, many of the larger manufacturers are successfully doing their own forming. This work can be accomplished only by experts. It is one of the most interesting features of hat making. The exact quantity of properly mixed fur is carefully weighed and placed upon an endless apron at one end of a box-like machine. At the other end of the machine there is a large perforated cone of sheet copper, revolving rapidly over a funnel, under which there is a powerful suction fan at work. As the attendant carefully feeds the fur to the machine in the proper quantity it is carried by the apron toward the cone. The suction of air attracts this fur and causes it to adhere to the surface of the cone. This continues until the cone is covered with a sufficient quantity of fur to make the hat. The whole operation requires only two or three minutes. As soon as the cone has accumulated the necessary fur a wet cloth is thrown over it, and a second cone, larger in dimension, is placed over that. Both are immersed in a tank of hot water for a few moments. This is the first stage of the felting. It causes the perfect adhesion of the various fibres. The operator slips this conical body from the cone. It is now several times larger than its ultimate size. It has assumed the primary form.

Sizing, as the felting is termed, is the next process. The body, which has just been removed from the cone, is placed in a sizing kettle, where it is shrunk in hot water. Continuous rubbing and rolling reduces it in size almost one-quarter. It still retains its cone shape, but it is now firmly felted. Care as well as skill is required to insure the even shrinking and the uniform distribution of the stock. Failure in any detail will cause streaks and weak spots in the finished article. The hat is now ready for dyeing. It is immersed in a great color vat and dyed to meet the prevailing fashion. Great improvements have been made in this detail during the past few years. The old wood colorings have been discarded, and coal-tar products are now used because they have been found more serviceable and increase the durability of the hat. Up to this point the manufacturing of stiff and soft hats has been along similar lines, but from this time on different methods are used. After dyeing the next step is to stiffen slightly the brim of the soft hat by the application of "water stiff," a solution of shellac. The body is now beginning to assume a definite form. It is stretched, blocked and pulled, and, with the aid of hot water, steam and ingenious machinery, it is given

stability of shape and form. The rough surface must now be cut off. This operation requires great care. If too much of the fur is removed all the previous skilled manipulation becomes valueless and the hat is ruined. This operation is known as "pouncing." It was formerly accomplished with a great deal of hand labor. It is now done by a machine and emery paper. This machine is a great time saver, and greatly facilitates the production of the plant. The crown is next given its shape, as demanded by the style. It is stretched over wooden blocks, ironed and re-ironed. It must then be carefully pounced by hand and steamed to tighten the felt. The brim must be treated exactly the same way, although it is not given shape at this time. Only men of skill and experience can engage in this portion of the work. There is a knack about pouncing by hand that can be acquired only by experience.

The hat is next flanged, or, rather, the brim is given its shape. The brim is placed upon a flange of metal or wood so as not to affect the crown. The entire hat resting on the flange is then placed under a huge receptacle containing heated sand and having on the under side a heavy cotton fabric, which comes in direct contact with the felt. After remaining in this position for several minutes the brim of the hat has its correct shape and trimming is in order. The turning up and edging each play an important part in the final process of shaping. In trimming artistic treatment is a necessity. Care must be taken in attaching the bands and bindings to preserve the neatness as well as the character of the design. The insertion of the sweat leather must be carefully done. All these and other details add greatly to the appearance and durability of the finished product.

The stiffening of the derby, better known as "the stiff hat," because of the character of the felting, is an interesting process. The hat body is impregnated with a solution of shellac and alcohol of given density. This substance is carefully worked into the heart of the body, and as a result the felting attains a condition of firmness. The hat is then placed on a wooden block, is immersed in hot water, and is given the proper proportion and shape before the final pressing. At the conclusion of this operation the superfluous gum is cleared away by a soda bath. When dry the hat is rigid throughout. It is then placed in an oven and kept there until it becomes pliable. A mould, to which tremendous pressure is given by mechanical or hydraulic means, completes the pressing after the derby has been pounced or finished. The pouncing of a derby is done upon a lathe. It is placed on a wooden block similar to the moulds used in pressing. Should the operator cut off too much of the surface fur, thus destroying the nap, the stiffening will be exposed and the work of the skilled men who preceded him loses its value. Curling or shaping of the brim is done with a variety of small tools, heat, steam, deftness of fingers and a good eye. The work of some of the experts who develop the stiff hat brims by the eye is little less than marvelous. The trimming, binding, etc., of stiff hats require even greater care in their selection and adjustment than in the case of soft hats.

Among American hat makers Charles Knox was one of the early specialists in beaver, and

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silk hats in New York. Robert Dunlop, of New York, has also an eminent name in the hat trade of America. The history of the John B. Stetson Company, of Philadelphia, is to a large degree the history of hat making in the United States for the last 39 years. From the small beginning of one room and two mechanics the Stetson factories have been developed to nine immense plants, having a floor space of over ten acres and a force of more than 2,500 employees. When John B. Stetson, in 1865, determined to manufacture hats he was known as the foremost expert in the mixing of furs and as one of the best hat finishers in the trade. He determined to avoid the cheap hat and to make only the highest grade of goods and to make them better than any other manufacturer. His output the first year did not exceed one hundred dozen hats. His capital was not more than \$1,000. In 1903 the John B. Stetson Company, with its great force of employees, supplemented by improved machinery, most of the patents for which are owned by the company, produced 105,800 dozens of hats. This company has introduced new machinery, which cheapens the cost of production without a sacrifice in quality, and has carried the fame of the city of Philadelphia to every quarter of the globe. A process has also been perfected whereby pure nutria and beaver fur may be successfully utilized in superfine hat making.

Another important improvement in hat making is that known as the "Boss" raw-edge kettle finished hat. This was introduced in the early seventies. Prior to this time all soft hats were made with bands and bindings, the latter being used to hold the brim in shape. The "Boss" raw-edge hat, as its name indicates, has no binding around the edge. It is shaped in hot water by frequent immersions and by the skillful hand work of an expert. The brim curling is a feature that cannot be accomplished in any other factory. This hat is, beyond question, the most remarkable specimen of headwear the world has ever seen. The John B. Stetson Company has been awarded the grand prize or gold medal at nearly every world's fair since 1876, but it holds as of almost equal value an order which it received from the British government for 10,000 hats for the South African constabulary during the Boer war. Prior to this war a number of American miners and cattlemen drifted into South Africa wearing Stetson's hats. They came in contact with General Baden-Powell, who admired the hats they wore and made inquiries about them. They were made of nutria fur, were better in quality than those produced anywhere in Europe. General Powell requested his government to order 10,000 of these hats, and the Stetson factories made and delivered them within six weeks of the receipt of the order. In 1876 the Stetson Company was awarded a gold medal by the Philadelphia Centennial Exposition. In 1879 it won a medal at Paris. In 1889 and in 1900 it won the grand prix at Paris. The official report making the award at the Paris Exposition in 1900 said, concerning the Stetson exhibit: "The products displayed here are, from every point of view, absolutely remarkable, but very especially the manufacture of soft hats, which is incontestably the acme of perfection of this epoch." WILLIAM F. FRAY,

First Vice-Pres. John B. Stetson Company.

Hatteras, Cape. See CAPE HATTERAS.

Hatteras Inlet, Capture of. In the forenoon of 26 Aug. 1861, a Union fleet of 7 vessels carrying 143 guns, under command of Flag-officer Silas H. Stringham, and 3 transports, carrying 930 men and a light battery, under command of Gen. Butler, set sail from Hampton Roads. Next afternoon the fleet arrived off Hatteras Inlet, the entrance to Pamlico Sound, which was guarded by Forts Hatteras and Clark, built by North Carolina on the south end of Hatteras Island, and mounting respectively 25 and 5 heavy guns. The forts, which were garrisoned by over 700 men, were under command of Maj. Andrews. At 10 A.M. of the 28th Stringham began the bombardment of the forts, and a little later about 300 troops, with two howitzers, were landed on the island above the forts. Fort Clark was silenced before noon, the greater part of its garrison retreating to Fort Hatteras, some escaping from the island by boats. At night the fleet withdrew, but renewed the attack upon Fort Hatteras early in the morning of the 29th, drove the gunners from their guns to the shelter of the bomb-proofs, and before noon the fort surrendered, after a loss of 30 killed and wounded. The Union loss was one wounded. Stringham and Butler returned to Hampton Roads, leaving three vessels as a sea-force and detachments of the Ninth and Twentieth New York and the Union coast-guard, under Col. R. C. Hawkins, to garrison the captured forts. The immediate results of the expedition were the capture of the two strong forts with their garrisons of 715 men, 31 heavy guns, 1,000 stand of arms, and the possession of the best sea entrance to the inland waters of North Carolina. Consult: The Century Company's 'Battles and Leaders of the Civil War,' Vol. I.; Maclay, 'History of the Navy,' Vol. II.

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Hatti-Sheriff, the Turkish name of an edict signed by the sultan, who subscribes it usually with these words: "Let my order be executed according to its form and import." These words are usually edged with gold, or otherwise ornamented. An order given in this way is irrevocable. The firman of 18 Feb. 1856, called usually Hatti humayun, "exalted writing," is the constitutional charter of the Turkish empire. It is a long document, undivided into articles, and prescribing various reforms administrative and financial, etc., but its chief importance consists in its explicit recognition of the principle of religious liberty, already admitted by the hatti of Gulhana, 3 Nov. 1839.

Hattiesburg, Miss., city, county-seat of Perry County; on the Leaf River, and on the Gulf & S. I., the New Orleans & N., the Mobile, J. & K. C., and the Pearl & L. R. R.R.'s; about 65 miles north of Biloxi and 84 miles southeast of Jackson. The Gulf & Ship Island railroad is the shortest route to the Gulf of Mexico. Hattiesburg is the trade centre of a large fertile agricultural region in which an excellent quality of cotton is extensively cultivated. The industries are growing rapidly and its good railroad facilities mean good markets. The chief industrial establishments are saw-mills, planing-mills, cottonseed-oil mills, a cotton compress, a foundry, machine-shops, boiler works, brick-yards,

a naval store factory, railroad shops, an ice-plant, and the electric light and power plant. It has three banks, a number of fine public buildings. Pop. (1900) 4,175; (1910) 11,733.

Hatto, hăt'tō, the name of two archbishops of Mainz, both somewhat conspicuous in the history of Germany. The first was chosen archbishop of Mainz in 891, d. 913. The second Hatto (d. 970) was a monk of the monastery of Fulda, and succeeded the celebrated Rabanus Maurus as abbot of the monastery of St. Boniface, about the year 942 and in 968 was raised to the see of Mainz, and continued one of the chief advisers of the emperor. Of his after-life and of his personal character most opposite accounts have been given. By some he is represented as an upright and successful administrator; by others as a selfish and hard-hearted oppressor of the poor; and the strange legend of his being devoured by rats, which Southey has perpetuated in his well-known ballad, is represented as an evidence of the estimate that was popularly formed regarding him. It is quite possible that this legend is of much later date, and that its real origin is to be traced to the equivocal designation of the tower on the Rhine, Mäusethurm, near Bingen, which has been selected as the scene of the occurrence. *Mäusethurm*, "Mouse-tower," is possibly only a corrupted form of *Mauth Thurm*, "Toll-tower," a sufficiently descriptive name; but the modified form of the word might readily suggest a legend of mice or rats. The date at which the Mäusethurm was built is unknown, and it is far from certain that it is not much later than the time of Hatto. See Baring-Gould, 'Curious Myths of the Middle Ages' (1869); Max Beheim, 'Die Mäusethurmsage' (1888).

Hat'ton, Sir Christopher, English statesman: b. at Holdenby about 1540; d. 1591. Lord chancellor of England, a favorite of Queen Elizabeth; was entered a gentleman commoner at Saint Mary Hall, Oxford, but removed without taking a degree, to the Inner Temple in 1560. He was introduced at court some time previous to the middle of the year 1564, and it is said Queen Elizabeth was so much struck with his graceful person and dancing that an introduction to her favor was the result, and gained him the name of "the dancing chancellor." He was a furious enemy of the Jesuits, and did not hesitate to accuse Parry, their defender in Parliament, and secure his execution. He was elected a member of Parliament in 1571, became captain of the Queen's Guard in 1572, vice-chamberlain and a privy-councillor in 1577, lord-chancellor in 1587. He was one of the commissioners for the trial of Mary Queen of Scots, in 1586. His artful speech to the unhappy queen, "If you are innocent you have nothing to fear; but by seeking to avoid a trial you stain your reputation by an everlasting blot," is supposed to have been mainly influential in inducing her to submit to trial. Spenser, whose patron he was, dedicated to him 'The Faerie Queen.'

Hatton, Frank, American journalist: b. Cambridge, Ohio, 28 April 1846; d. Washington, D. C., 30 April 1894. He served through the Civil War in the Army of the Cumberland, being commissioned and was subsequently part-

ner with Robert J. Burdette (q.v.) in the proprietorship of the Burlington *Hawkeye*. He was assistant postmaster-general (1881-4); postmaster-general (1884-5); editor of *Chicago Mail* (1884-8); and editor of the *Washington Post* (1888-94).

Hatton, John Liptrot, English composer: b. Liverpool 1809; d. Margate, Kent, 20 Sept. 1886. Removing to London in 1832 he became famous for his many operas, cantatas, overtures, entr'actes, etc., and was musical director of the Princess Theatre 1853-9. He is now, however, remembered chiefly for his admirable settings of English songs, such as 'Good-bye, Sweetheart,' 'The Tar's Song,' 'The Bait,' etc.

Hatton, Joseph, English journalist, novelist, and playwright: b. Andover 3 Feb. 1841; d. London 31 July 1907. Beginning journalism on the Derbyshire *Times*, he went to London, where he edited the 'Gentleman's Magazine' (1868-74); and became a newspaper correspondent for the *New York Times* and other journals. Among his numerous novels are: 'Clytie' (1874); 'Queen of Bohemia' (1877); 'John Needham's Double' (1885), dramatized for E. S. Willard; 'By Order of the Czar,' a novel of Russian life; 'Princess Mazaroff'; 'Under the Great Seal'; 'When Greek Meets Greek,' a novel of the French Revolution successfully dramatized; 'When Rogues Fall Out' (1899). Among his miscellaneous publications the best-known are: 'Journalistic London'; 'The New Ceylon'; 'Henry Irving's Impressions of America'; 'Old Lamps and New'; while among his plays may be cited a version of 'The Scarlet Letter' successfully acted in the United States; 'The Prince and the Pauper'; 'Liz'; and 'A Daughter of France.'

Hauck, hāk, Minnie, American vocalist: b. New York 16 Nov. 1852. She appeared in concert in New Orleans at 13, afterward studied with Errani in New York and made her début as an opera singer in 'La Sonnambula' in 1868. She has been uniformly successful both in the United States and Europe, but is best known in the title role of Carmen. She is married to the Chevalier de Hesse-Wartegg.

Haupt, howpt, Herman, American engineer: b. Philadelphia, Pa., 26 March 1817; d. 14 Dec. 1905. He was graduated at West Point in 1855, but became a civil engineer, and joined the staff engaged on the public works of Pennsylvania. For three years he was professor of civil engineering and mathematics in Pennsylvania College but in 1847 became consulting engineer of the Philadelphia Railroad. He was afterward chief engineer of the Hoosac Tunnel and during the Civil War chief of the United States Bureau of Military Railroads. The Royal Polytechnic Society of Great Britain gave him their highest prize for the drilling machine which he invented, and he first made practicable the transportation and distribution of oil from the well side. He wrote 'Hints on Bridge Building' (1840); 'General Theory of Bridge Construction' (1852); 'A Consideration of the Plans Proposed for the Improvement of the Ohio River' (1855); 'Military Bridges' (1864).

Haupt, Lewis Muhlenberg, American engineer: b. Gettysburg, Pa., 21 March 1841. He

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was educated at Harvard and West Point. From 1872 to 1892 he was professor of civil engineering in the University of Pennsylvania, and for the year ending 1886 edited the 'Engineering Register.' From 1897 to 1899 he was a member of the Nicaraguan and the Isthmian Canal Commissions. His published works include: 'Working Drawings and How to Make and Use Them' (1881); 'Canals and Their Economic Relation to Transportation' (1890).

Haupt, Paul, American Assyriologist: b. Grlitz, Germany, 25 Nov. 1858. He was graduated at the Gymnasium Augustum, Grlitz, in 1876; studied in Leipzig and Berlin, and settled in Göttingen where in 1883 he was appointed extraordinary professor of Assyriology. In the autumn of the same year he accepted the chair of Semitic languages at Johns Hopkins University, Baltimore, Md. He projected and continued to edit the so-called Polychrome Bible. (See BIBLE, POLYCHROME.) Among his many writings in periodical, pamphlet and book form, the most important volumes are 'Das babylonische Nimrod-Epos' (1891); 'Akkadische und sumerische Keilschrifttexte' (1882); 'Prolegomena to a Comparative Assyrian Grammar' (1888).

Hauptmann, haupt'män, Gerhart, German dramatist: b. Salzbrunn, Silesia, 15 Nov. 1862. After study at the Breslau Art School, he attended the universities of Jena and Berlin, traveled in Italy and Switzerland, and first appeared in literature with his epic, 'Promethidenlos' (1885). This he followed by a swift succession of dramas—'Vor Sonnenaufgang' (1889), frankly socialistic and provocative of violent discussion; 'Das Friedensfest' (1890); 'Einsame Menschen' (1891); and 'Die Weber' (1892), a story of an unsuccessful uprising of the Silesian weavers, typifying the hopeless condition of the proletariat. In these works Hauptmann reveals the influence of Tolstoi and Ibsen, and a strong revolt against the conditions imposed, particularly upon the working-class, by a military and plutocratic régime. To this motif he returns in 'Fuhrmann Henschel' (1898). But he strikes a different note in 'Hanneles Himmelfahrt' (1893), a mystic 'dream-poem' as the author styles it, and 'Die versunkene Glocke' (1897; Eng. trans. by Meltzer 1900), which harks back to an indefinite period of the Middle Ages and makes artistic use of the primitive Germanic fairy-lore. In 'Kollege Crampton' (1892), 'Der Biberpelz' (1893) with its inferior sequel 'Der rote Hahn' (1901), and 'Schluck und Jan' (1900) he displays gifts of humor and satire. Other works are 'Florian Geyer' (1895) and 'Michael Kramer' (1900). Hauptmann is the chief figure in modern German drama. He excels less in dramatic structure than in art of characterization, and despite crudity and occasional dullness attains genuine poetic value.

Hauptmann, Moritz, German musician: b. Dresden 13 Oct. 1792; d. Leipzig 3 Jan. 1869. He studied at Gotha; was violinist at the court in Dresden in 1812; in 1815-20 was employed as music teacher in the family of a Russian prince; in 1842 he was appointed cantor of the Thomaschule in Leipzig, and the next year became professor of counterpoint at the Leipzig conservatory, where he was very successful and popular as a teacher. His compositions include

motettes, an offertory, and sonatas for violin and piano. In 1853 he published his 'Die Natur der Harmonik und Metrik,' a very important theoretical work.

Hausmannite, a native manganate of manganese, having the formula $MnO.Mn_2O_3$, and crystallizing in the tetragonal system, with octahedral habit. It is brownish black in color, and opaque with a submetallic lustre. It has a hardness of from 5 to 5.5, and a specific gravity of from 4.72 to 4.86. Hausmannite dissolves in hydrochloric acid, with evolution of chlorine gas. It occurs in Germany, Sweden, and elsewhere, usually in connection with porphyry. It was named in honor of the German metallurgist, J. F. L. Hausmann.

Hausa, how'sä. See HOUSSA.

Hausmann, Georges Eugène, zhörzh è-zhân ôs-män, BARON DE, French municipal officer: b. Paris 27 March 1809; d. there 11 Jan. 1891. He studied law, and under Louis Philippe was sous-prefect of various places. The February revolution of 1848 caused the forfeiture of his office, but Louis Napoleon in 1853 made him prefect of the Seine, and he applied himself to the improvement and adornment of Paris with such energy that the city became transformed under his administration.

Hautboy, hō'boi (French *hautbois*, "high wood," alluding to its tone); a wooden wind-instrument of two-foot tone, played with a double reed. Also an organ stop, consisting of reed pipes slightly conical, and surmounted by a bell and cap of eight feet pitch. The tone is thin and soft.

Haüy, René Just, ré-nā zhüst ä-ü-è or ä-wè, French mineralogist: b. St. Just, Oise, 28 Feb. 1743; d. 3 June 1822. He was trained for the Church and took priest's orders, but turned to mineralogy, and acquired a great reputation by a series of important discoveries. Among the chief of these is the geometrical law of crystallization, according to which a given mineral uniformly contains the same primary form as its basis of crystallization. From that time, according to Herschel, mineralogy first ceased to be "a mere laborious cataloguing of stones and rubbish." In 1794 Haüy became keeper of the cabinet of the School of Mines, and in 1802 professor of mineralogy in the Museum of Natural History. His works include: 'Traité de Mineralogie' (1801), and 'Traité de Crystallographie' (1822).

Haüynite, hä'win it, or Haüyne, hä'wîn, a mineral of the sodalite group, occurring in certain igneous rocks, and notably in the lavas of Mt. Vesuvius. It is a silicate and sulphate of sodium, calcium and aluminum, crystallizing in the isometric system. It is usually translucent with a vitreous lustre, a hardness of from 5.5 to 6, and a specific gravity of about 2.45. Haüynite is commonly blue or green, though red and yellow specimens are also known. It was named in honor of the French mineralogist, R. J. Haüy.

Havan'a (Sp. LA HABANA, Iā hābā'nā). Cuba, its capital and the commercial centre of the West Indies, second city of Spanish North America; pop. 242,055. It occupies nine square miles on the west side of the Bay of Havana on the north coast, one of the noblest

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1. Cathedral of Havana.

2. Colon Park, Havana.

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harbors in the world, with deep water up to the quays; entered by a narrow channel $\frac{3}{4}$ of a mile long, protected by Punta Castle on the west and Morro Castle and La Cabafia on the east. It is in two sharply distinct sections. The old city, the commercial quarter, was built on the small western peninsula dividing the sea from the harbor, a low plain cut by a small stream on the west, strengthened by a city wall only torn down a generation ago. It is largely, and was entirely till the American occupation, a maze of narrow, crooked lanes traversed by one or two broader streets; the chief of which are the Calle O'Reilly, the main business street, running from the governor's palace to the city wall, and the Calle Obispo (Bishop Street). The new city is on a ring of hills 150 feet high south and west of the old, with the castle of El Principe on the crest, and has a wealth of broad and finely shaded macadamized streets, drives, promenades, parks, plazas, flower-gardens, fountains, statues, etc., which make it one of the handsomest cities in the world. There is no "West End" in Havana, the houses of the wealthy being scattered through every part, usually of classic pattern, with an inner courtyard or patio surrounded by marble or stucco columns, containing a garden of tropical vegetation and a central fountain. The handsomest residence street, next to the new suburb Vedado, is the Cerro, a long thoroughfare running up a hill at the farther end, and bordered by immense old villas in the midst of splendid gardens. The finest drives and promenades are the Malecon, a new thoroughfare along the water front from Prado to the Vedado, the Prado, a boulevard with a double row of shade-trees in the middle, running from Punta Castle outside the old wall, and ending in the largest park in the city, Colón Park or Campo Marte, and the Calle de la Reina (Queen Street) starting west from this park and continued as the Paseo de Tacón to the citadel of El Principe. The Alameda de Paula along the bay is also a favorite promenade.

Among buildings, the most interesting are the palace of the old captains-general, facing the Plaza de Armas near the harbor front, the cathedral, built 1764, and supposed to contain the ashes of Columbus in an urn till it was removed to Spain in 1898 (but the San Dominicans claim they have his authentic bones), and the Tacón Theatre, perhaps the largest in the world. There are several other theatres and opera-houses, and many clubs, etc. The chief educational institutions are the University of Havana, founded 1670 by the Dominicans; the Jesuit boys' college de Belén, with a museum, observatory, a library rich in old Cuban history, etc.; College of American Augustinian Fathers, founded 1901. Famous among benevolent institutions are the Casa de Beneficencia, founded by Las Casas for infants. There are three general hospitals, a great lazaretto for lepers, and an insane hospital in the city and vicinity. Over 100 newspapers, etc., are published in the city.

The water supply of the city was installed by a Cuban engineer, Albear, some 40 years ago, and is considered a remarkable specimen of good workmanship. It comes from the Vento by an aqueduct 12 miles long, known as the Canal of Albear. In all other respects the Americans at the conquest found an undecipherable state of filth and disease. The city was the

prey of yellow fever; the sewers had seldom been cleaned since they were laid down, and some of them were clogged with generations of rotteness; the buildings were pest-holes; and in that dungeon of horrors, the military hospital, 70 per cent of the inmates died. The United States forces in their short stay transformed this reeking home of pestilence into one of the healthiest cities in America. In systematic order streets were cleaned, repaved, widened; squads of cleaners were sent from house to house, emptying the Augean stables under them, whitewashing and disinfecting them, and where they were shanties that were nests of infection, tearing them down; the hospital was cleaned, disinfected, and covered deep with whitewash, and turned into a schoolhouse. New business streets were made by widening old lanes; parks were cleared up, and a fine sea-wall along the ocean to the north was built. The average deaths from yellow fever 1887-98 were 440; in 1896 they were 1,262; in 1901, for the first time in its history, only three or four. A Cuban physician of Irish descent, Dr. Carlos Finlay, now chief sanitary officer of Havana, was the originator of the mosquito theory of the yellow fever. Gen. Wood and the American army surgeons, however, deserve much credit for making the theory of practical use.

The climate is not severe. The mean annual temperature is 77°; the range from hottest to coldest 82° to 71°; the highest recorded, 100.6°, the lowest 49.6°. The mean rainfall is 54 inches.

Havana is the market of western Cuba, the head of the island's banking and commercial interests, and the emporium of the West Indies. Besides being the centre of the island railway system and of a great domestic shipping trade, especially with Santiago, it is the focus of a vast foreign commerce with Spain, France, England, and the United States, regular ocean lines running weekly to the first three and semi-weekly to the latter, besides others to the other West Indies. It has excellent covered wharves and a capacious dry-dock to aid this. Regla, on the opposite side of the bay, contains the sugar wharves and railway termini. In 1909 it had exports of about \$47,203,167, more than half to the United States, an increase of \$41,177 in one year, mainly ours; and its imports had increased from \$60,962,528 to \$65,075,683, a difference of \$4,113,155 in the single year from 1908 to 1909. The entrances and clearances of ocean vessels in 1909 were over 1,500,000, and of domestic vessels nearly 3,000, with an average tonnage of about 635. The exports are chiefly of sugar, tobacco, cigars, and cigarettes; the imports, flour, rice, lard, and other foods, cotton, and metals. Its manufactures are mainly tobacco products; its cigar factories, of which there are over 100 of the first rank, are the largest in the world, one covering an entire square. It also manufactures confectionery, perfumes, rum, etc. The new electric street railway system is one of the finest of its kind, with 36 miles of track.

Population.—In 1869 it was 242,055, 52,900 being foreign; in 1910 it was about 302,526. About one third were unable to read; and about one third from 5 to 17 attended school.

History.—Havana was founded here (transferred from an older site) by Diego de Velasquez in 1519, and called by him "the key of the

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New World. Burnt by buccaneers in 1508, it was rebuilt and made the chief naval station of Spain in this hemisphere, twice sacked in 1555 and 1563, it was a storm centre of wars and piracies for two centuries. In 1762 the English captured it, but restored it to Spain the next year. In 1802 it was partly burnt, but under the famous Governor Tacón, its second founder, commemorated at every turn, it was rebuilt from a straw-thatched wooden town to a city of brick and stone. For its late history, see CUBA. Consult: Norton's 'Handbook of Havana and Cuba' (1900).

Havana, Ill., city, county-seat of Mason County; on the Illinois River, and on the Chicago, P. & St. L. and the Illinois C. R.R.'s; about 39 miles northwest of Springfield. It is situated in an agricultural region and is the trade centre for a large extent of country. The chief manufactures are flour, agricultural implements, drills, gasoline engines, and some factory supplies. Its trade is chiefly in grain, fruit, vegetables, and dairy products. The waterworks are owned and operated by the city. Pop. (1910) 1,842.

Havelock, häv'ë-lök, Sir Henry, English soldier; b. Bishop-Wearmouth, near Sunderland, 5 April 1795; d. Dilkusha, India, 24 Nov. 1857. Entering the army, he served with distinction in the Burmese war (1824-6); in 1829 married, became a Baptist, and was distinguished during the remainder of his life by his earnest religious zeal. He participated in the Afghan war, and in the defeat of Mohammed Akbar, 1843. He took part in the Mahratta war, and distinguished himself in the Sikh war of 1845. He commanded a division in the Persian war (1856-7) and on the outbreak of the Indian mutiny was despatched to Allahabad in order to support Sir H. Lawrence at Lucknow and Sir H. Wheeler at Cawnpore. On arriving at Cawnpore he found that Nana Sahib had massacred the prisoners. Pursuing his march to Lucknow, he defeated the rebels at Bithoor, and finally won the battle of Alumbagh. Having captured Lucknow, Havelock and Outram were shut up there until relieved by Sir Colin Campbell 17 Nov. 1857. He was raised to the rank of major-general, made a K. C. B., and (before his death was known) created a baronet. Consult lives by Brock (1858); Marshman (1890); Forbes (1890).

Havemeyer, häv'ë-mi'ër, William Frederick, American banker: b. 31 March 1850. He received his education in private schools and entered into commercial business, and as a successful financier became vice-president and director of the National Bank of North America, and of the Queens County Bank of Long Island, and took a place in the board of directors of numerous railroad and banking corporations.

Ha'ven, Alice Bradley, American author: b. Hudson, N. Y., 1828; d. 1863. Her maiden name was Emily Bradley, and while a school girl she sent under the pseudonym of "ALICE G. LEE" many sketches to the Saturday 'Gazette,' then recently established by Joseph C. Neal in Philadelphia. She was married to Mr. Neal in 1846, and at his request assumed and retained the name of Alice. On the death of her husband in 1847, she conducted the 'Gazette' for several years. She published in 1850 'Gos-

sips of Rivertown, with Sketches in Prose and Verse,' and became widely known by her series of juvenile stories, as 'Helen Morton,' 'Pictures from the Bible,' 'No such Word as Fail,' 'Patient Waiting no Loss,' 'Contentment Better than Wealth,' 'All's not Gold that Glitters,' 'Out of Debt Out of Danger,' etc. In 1853 she was married to Mr. Samuel L. Haven.

Haven, Erastus Otis, American Methodist bishop and educator: b. Boston, Mass., 1 Nov. 1820; d. Salem, Ore., 3 Aug. 1881. He was graduated at the Wesleyan University, Middletown, Conn., in 1842, soon after entered the ministry of the Methodist Episcopal Church, was appointed teacher of natural science in the Amenia Seminary, N. Y., and in 1845 was elected principal of that institution. He was professor of Latin and Greek in the University of Michigan 1854-6; editor of 'Zion's Herald' 1856-63, and sat in the Massachusetts Senate 1862-3. He was president of the University of Michigan 1863-7, and of Northwestern University, Evanston, Ill., 1869-72. He was subsequently chancellor of Syracuse University and was elected bishop in 1880. He published 'The Young Man Advised' (1855); 'Pillars of Truth' (1866); 'Rhetoric' (1869).

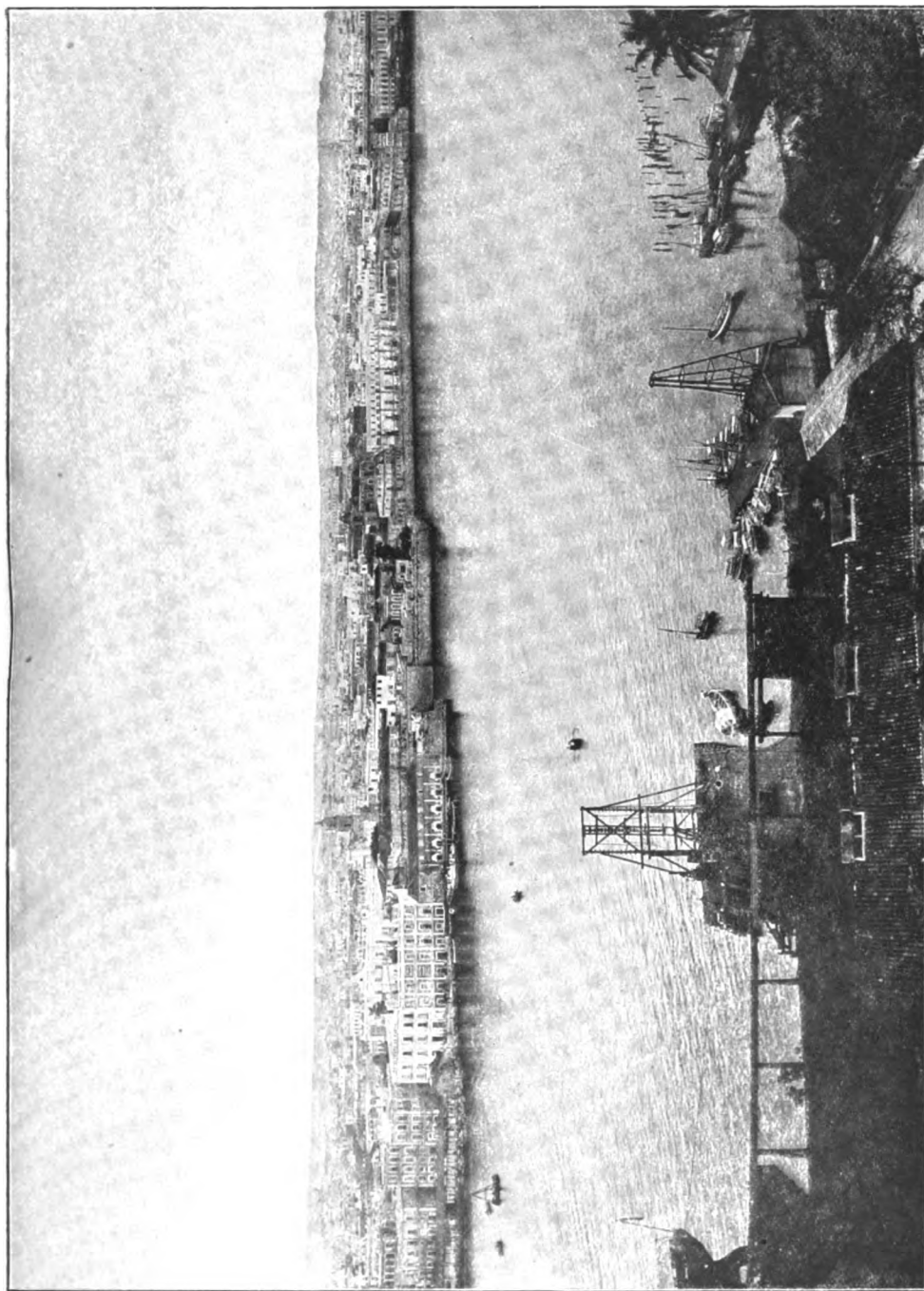
Haven, Gilbert, American Methodist bishop: b. Malden, Mass., 19 Sept. 1821; d. there 30 Jan. 1880. He was an able writer, and a forceful preacher. In the Civil War he was the first commissioned chaplain in the Federal army. He was editor of 'Zion's Herald' 1867-72, and was elected bishop in the latter year. He published 'The Pilgrim's Wallet, or Sketches of Travel in England, France, and Germany' (1865); 'National Sermons' (1869); 'Life of Father Taylor, the Sailor Preacher' (1871); 'Our Next-Door Neighbor, or a Winter in Mexico' (1875); etc.

Haverford College, under the auspices of the Society of Friends founded in 1833 in Haverford, Pa. It was first known as Haverford School, but in 1845 it was suspended for the purpose of collecting an endowment, and in 1856 it was made a college. It was the first collegiate institute in the United States which was founded and conducted entirely within the Society of Friends. Others besides the sons of Friends have been admitted as pupils since 1849. It is well equipped in laboratory requirements and in its library facilities. In 1910 the college reported 22 professors and instructors and 150 students. There were in the library about 55,000 volumes.

Havergal, häv'ër-gal, Frances Ridley, English hymn-writer: b. Astley, Worcestershire, 14 Dec. 1836; d. Swansea, Wales, 3 June 1879. She was a frequent contributor to 'Good Words,' and the chief English religious periodicals, and her musical harmonies were praised by the German composer Hiller. Her poems and hymns were collected in several volumes. 'The Ministry of Song' (1870) being the first. Her 'Poetical Works' (1884) appeared under the editorship of M. V. G. Havergal. Of her hymns, which contain her best work and are found in all collections, the most familiar is 'Take my Life and Let it Be.'

Haverhill, häv'ër-il, Mass., city in Essex County; on the Merrimac River at the head of navigation, and on the Boston & M. railroad;

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VIEW OF HAVANA FROM CABANAS.

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about 30 miles from Boston. It is an important centre of street railway traffic, electric lines radiating from it connecting it with all of the important cities and towns of northeastern Massachusetts and southeastern New Hampshire. Three highway bridges span the river, connecting the city respectively with the Bradford district, with Groveland, and with West Newbury. Haverhill, including Bradford, which was annexed to it, 4 Jan. 1897, is 9 miles long and $3\frac{1}{2}$ miles wide, and covers an area of 32 square miles. Bounding the entire southern length of the original city and separating it from its new adjunct, Bradford, from Groveland, and from West Newbury, flows the Merrimac River, navigable from the sea to the very heart of the city, and affording for freightage or pleasuring a delightful waterway. From the river on both sides the land slopes upward, the lower parts near the river being occupied for manufacturing and commercial purposes, the higher lands for residences. Five large lakes—Kenoza, Round Pond, Saltonstall, Crystal, and Chadwick's Pond—lie entirely within the limits of the city, and three of them, with a large artificial lake at Mill Vale, afford an abundant supply of water for all purposes. The eastern and western parts of the city are known as East Haverhill and West Haverhill, their more thickly settled parts being respectively Rocks Village and Ayers Village; the southern portion, in the Bradford district, is known as Ward Hill.

Government.—The municipal government is administered by a mayor, board of aldermen consisting of seven members, one from each ward of the city, but elected by the votes of the whole city, and 14 councilmen, two from each ward of the city and elected by the votes of the ward. These officials are elected annually and hold office for a single year. The schools are administered by a school board of 21 members, one member being elected annually by each ward and holding office for three years. The administrative officer of the board is the superintendent of schools, and the mayor is, *ex-officio*, chairman of the board. The water board consists of five members, each appointed by the city government for a term of five years; the park commission consists of five members, each appointed by the city government for a term of five years; the trustees of the Public Library, six in number, and the trustees of the City Hospital, five in number, hold office for life, vacancies being filled by the boards of trustees.

Financial.—The assessed valuation of the city, 1 Jan. 1911, was \$24,738,350. The tax levy for 1903 was \$490,267.64; the State tax, \$22,875; the county tax, \$28,726.40; the rate of taxation per \$100, \$1.90. The net bonded debt in 1911 was: Municipal loans, \$909,126.14; water loans, \$573,873.02; total, \$1,482,999.16. The interests of the business community are served by six national banks, having an aggregate capital of \$795,000. There are three savings banks, two co-operative banks with an authorized capital of \$1,000,000 each, and a safe deposit and trust company.

Manufactures.—The city has many and varied manufactures, the number of manufacturing establishments of all kinds being (U. S. Census of 1910) 346, with an aggregate capital of \$14,786,000. The average number of wage-earners

employed is 11,689, to whom is paid an aggregate of \$7,365,000. The principal manufactures are those connected with the boot and shoe industry. There are over 150 boot and shoe factories, with an aggregate capital of \$3,500,000, and an annual production valued at \$15,500,000; 98 manufactories of cut stock, aggregate capital, \$641,927, value of product, \$3,495,433; 22 manufactories of boot and shoe findings, capital, \$262,586, value of product, \$811,515. The number of cases of shoes annually sent forth is about 450,000, and the market for them is not alone the United States, but England, Germany, Australia, the South American states, and other foreign countries. Other important industries are hat and woolen manufactures, box making, brick making, machine building, etc.

Schools.—The public school buildings, in 1910, were 37, their aggregate value about \$700,000. There were 199 teachers employed in the day schools, and an enrollment of 5,700 pupils. There are three parochial schools, Saint James (Irish), with a membership of 921; Saint Joseph's (French), with an enrollment of 372, and the Brothers of the Sacred Heart (French), with an enrollment of 334. Haverhill is also the seat of Bradford Academy, a famous and flourishing school for young ladies, established in 1804.

Board of Trade.—The membership of the Board of Trade includes all of the leading men of business and influence, and its object is "to forward the mercantile interests of Haverhill through the medium of equitable laws and regulations of the General Court and of the municipal government; to procure and spread such information as will conduce to the advancement and elevation of commercial dealings, and the extension of wise and just methods of business."

Parks.—There are 27 public parks in the city. Winnikenni Park, adjacent to Lake Kenoza, is very extensive, diversified, and beautiful, and abounds in delightful drives.

Public Buildings, Institutions, etc.—The Public Library was founded in 1875 by the generosity of E. J. M. Hale, whose gifts to it, including a legacy of \$100,000, amounted to more than \$175,000. The library contains nearly 100,000 volumes, with an annual circulation of nearly 160,000. There are four branch libraries for the accommodation of the more remote parts of the city, and 12 loan libraries placed in the district schools. Loan libraries are also established in connection with each grammar school, books being sent to and from these schools each week. The Hale Hospital occupies a set of buildings of the most modern type and equipment. The Historical Society occupies the "Buttonwoods," a large old mansion house on Water street, formerly the seat of the Saltonstall family, marking very closely the site of the first settlement of Haverhill. The Whittier homestead, the birthplace of the poet, John Greenleaf Whittier (17 Dec. 1807) and the scene of his poem 'Snow-Bound,' is situated about three miles from the heart of the city on the Merrimac road. The house, with the grounds surrounding it, is owned by the Whittier Association, and it is visited annually by many pilgrims. The Y. M. C. A. occupies a magnificent set of buildings, including a thoroughly equipped gymnasium. The Pen-tucket Club occupies an elegant mansion, formerly the Duncan residence, more than a century

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old, designed by the celebrated architect, Haviland, but harmoniously enlarged to meet the needs of the social club now occupying it. The local military organization is Company F, of Eighth Regiment, M. V. M., organized in 1869, and attached to the Second Brigade. Among the numerous fraternal and other organizations may be mentioned seven Masonic bodies, maintaining a Freemason's Hall Association, with a capital of \$50,000; eight lodges of Odd Fellows, maintaining an Odd Fellows' Hall Association, with a capital of \$100,000; Elks, Foresters, G. A. R., Sons of Veterans, Woman's Relief Corps, Red Men, Daughters of Pocahontas, Knights of Malta, American Workmen, Knights of Pythias, Patrons of Husbandry, Royal Arcanum, Boot and Shoe Workers' Union, Shoe Workers' Protective Union, etc., while two literary clubs, the Monday Evening Club and the Fortnightly Club, are noteworthy.

History.—The first settlement of Haverhill was made in June 1640, by twelve men from Newbury and Ipswich, the new settlement being known as Pentucket. In the following year (1641) the Rev. John Ward came from Ipswich to be the minister and leader of the colonists, and so pleased were they with his character, attainments, and zeal that they named the place Haverhill from the older Haverhill in England, which was his birthplace. In 1642 title to the tract of land, 14 miles in length, was obtained by purchase and deed from the Indians, Passaquog and Saggahew. In 1660 the first public school was established, its teacher, Thomas Wasse, his salary £10 a year. For many years Haverhill was a frontier town, and suffered from the forays of the Indians. On 15 March 1697 the savages attacked the house of Thomas Duston, carrying away his wife Hannah, her infant child and her nurse, Mary Neff. The child was soon killed, but Mrs. Duston, taken to an island in the Merrimac River above Concord, N. H., in the night, with the assistance of her nurse and a captive youth, killed the Indians who were guarding her, as they lay asleep, scalped them, and escaped in a canoe, carrying the scalps as proof of her deed. A monument to her in City Hall Park commemorates her heroism. On 29 Aug. 1708 the Indians made a murderous foray upon the centre of the town, setting fire to the church and the houses, killing the Rev. Benjamin Rolfe and 15 others, carrying away about 20 captives, but leaving about 30 of their own number dead. These are the more notable among many Indian attacks upon the place. At the outbreak of the Revolution Haverhill contributed to the patriot cause her quota of men, 74 of her sons being engaged in the battle of Bunker Hill. On 4 Nov. 1789 George Washington visited the town, remaining over night at Harrod's tavern, on the site where the City Hall now is, and paying delightful compliments to the town and its beautiful location. In 1793 a stage coach line was established between Boston and Haverhill, "fare, 3d. a mile," running twice a week. 6 Sept. 1793 the first newspaper printed in the town was published. It was called 'The Guardian of Freedom,' and was issued weekly at nine shillings a year. In 1794 the first bridge across the river was erected. In 1827 the Haverhill Academy was opened, one of the students, John G. Whittier (q.v.), writing an ode for the dedication. In 1828 the Rocks Bridge was com-

pleted, and in the same year the steamer Merrimac, the first on the river, began running between Haverhill and Newburyport. In 1837 the railroad, now the Boston & Maine, was extended from Andover to Haverhill. In 1842 certain citizens of Haverhill presented to Congress, through John Quincy Adams (q.v.), the famous petition for the dissolution of the Union, the object being to rebuke the Congressional agitators. In the civil war Haverhill contributed to the Union cause about 1,300 men, her first troops leaving for the front on the day when the Massachusetts Sixth was attacked in Baltimore. To those who fell in that war she erected in 1869 on one of her principal squares a beautiful soldiers' monument. Haverhill became a city in 1869. The old place has suffered from several disastrous fires, one in 1775 which destroyed 17 buildings in the little town; one in 1873, which burned out 35 business houses, and the most disastrous one of 17 Feb. 1882, which burnt out about 300 business firms and destroyed about \$2,000,000 worth of property. On 6 Nov. 1888 the City Hall, built in 1861, was gutted by fire, but it was immediately rebuilt.

The shoe and leather industry of Haverhill dates back almost to the time of the first settlement, for in 1643 Job Clement established a tannery, and at about the same time Andrew Greeley practised the trade of shoemaker for the little settlement. In 1679 Benjamin Webster and Samuel Parker were permitted to live in the town and to follow the trade of shoemaker. In 1812 Moses Atwood sent a wagon-load of shoes to Philadelphia, probably the first export of this product from the town. In 1818 a special two-horse wagon was regularly run between Haverhill and Boston for the transportation of shoes, and in 1835 the traffic employed 40 horses and two yoke of oxen. The coming of the railroad to Haverhill in 1837 furnished a better means of transportation and gave new impetus to manufacturing. In 1850 about 50,000 cases of shoes were sent out; in 1860 about 94,000, valued at about \$3,750,000. The change in 1870 from town government to city government was coincident with an awakening to new life. Old residential streets were changed to manufacturing centres, old farms and pastures became thickly covered with residences, and in manufacturing the city rapidly grew to be one of the three cities leading in the output of shoes. To-day fully 10 per cent of the total output of shoes in the United States and nearly one-fourth of the total number produced in Massachusetts is made in the Haverhill factories. In 1890 Haverhill celebrated the 250th anniversary of its settlement amid a great gathering of distinguished sons and guests, the address being by the Rev. Samuel H. Duncan, the historical poem by Dr. John Crowell, and the beloved and distinguished son of the town, the poet Whittier, sending as a tribute his beautiful poem, "Haverhill."

Population.—The population of Haverhill (U. S. Census of 1900) was 37,175, an increase from 27,412 in 1890. A part of this increase was due to the annexation of Bradford, the population of which in 1895 was 4,736. The population of the city, according to the census of 1910, was 44,115, which showed an increase of 6,040, or 18.7 per cent, since the last official enumeration was made.

ALBERT L. BARTLETT.

Haverhill, N. H., village, county-seat of Grafton County; on the Connecticut River, and on the Boston & M. railroad; about 70 miles northwest of Concord. The town contains several villages, the largest of which is Haverhill. The surrounding region is largely devoted to agriculture, but the granite quarries in the vicinity add to the industrial wealth of the village. Some of the manufactures are flour, lumber, wagons, furniture, whetstones, made from the stone found nearby, and dairy products. Pop. (1910) 3,498.

Havers, Clopton, English anatomist and physician: b. 1650; d. 1702. After study at Cambridge he proceeded to Utrecht, where he graduated M.D. in 1685. He established himself as a practising physician in London, and acquired a reputation by his profound studies on bone structure, which are exhaustively summarized in his '*Osteologia Nova*' (1691). His name is perpetuated in osteology by the technical term "Haversian canals." Among his other works are: '*Researches on the Lachrymal Gland*' (1691); '*Survey of the Microcosm*' (1695); and '*Discourse on the Concocion of Food*' (1699).

Haverschmidt, Francis, Dutch poet: b. Leeuwardien 1835; d. Schiedam 1894. Educated for the Church, he completed his studies at Leyden. He became known as "Piet Paaltjens," the pseudonym under which he published '*Snikken en Grimlachjes*' (1867), a collection of poems, six editions of which were sold in two years. He published also '*Familie en Kennissen*' (1876), a collection of prose essays.

Haversian (hă-vér'zian) **Canals**. See **BONE**.

Haverstraw, N. Y., village in Rockland County; on the Haverstraw Bay, a part of the Hudson River, and on the West Shore and the New Jersey & N. Y. R.R.'s; about 30 miles north of New York and 35 miles south of West Point. The first settlement was made by the Dutch, who established here, about 1710, a trading post. It became a precinct in 1719, but the town was not incorporated until 1854. A short distance north of the village of Haverstraw, and near West Haverstraw, is the "Old Treason House," the house owned in Revolutionary days by Thomas H. Smith, and the place where Arnold and André met in September 1780, and made all arrangements for the surrender of West Point. Except the addition of a wing, the house is to-day about as it was when Arnold visited it. From the room in which the final arrangements were made, may be seen the Hudson and the opposite shore along which André journeyed toward Tarrytown. The "Haverstraw Community" was organized in Haverstraw in 1825, but remained in existence as a community only a few years. The chief industry of the village is brickmaking. Other manufactures are dynamite, baskets and brickmaking machinery. The village has an excellent high school and a public library. Pop. (1910) 5,669.

Havestad, Bernard, German Jesuit and missionary: b. Cologne 1715; d. Munster 1778. In 1748 he was sent as a missionary to Chile, where he rapidly learned the native dialect. He traveled through the lesser known parts of the country, visiting the Araucanians, the Cuen-

ches, the Huilichos, the Guaicurus, etc., and collected a great mass of interesting information on the customs, the natural productions, statistics, etc., of the region. On the expulsion of his order in 1768, he was arrested and conducted to Lima. He escaped death from shipwreck, and returned to Germany, where he published '*Chilidugu, sive Res Chilenses*' (1777).

Havet, Ernest Auguste Eugène, French scholar and philosopher: b. Paris 11 April 1813; d. 1889. As a brilliant student, he received several educational appointments, and in 1840 was called to Paris as professor of Greek literature on the staff of the normal school. In 1855 he was appointed professor of Latin eloquence in the College de France. The chief of his many learned works is '*Christianisme et ses origines*' (4 vols., 1871-84).

Haviland, John, American architect and engineer: b. England 15 Dec. 1792; d. Philadelphia 28 March 1852. He studied architecture with Elmes in London, subsequently went to Russia with a view of entering the imperial corps of engineers, and in 1816 emigrated to the United States. The Pittsburg penitentiary, one of his earliest works, introduced the radiating form of constructing prisons, which was extensively adopted in the United States and in Europe. Among the principal edifices built after his plans are the halls of justice, better known as the "Tombs" (q.v.), in New York, rebuilt in 1902; the United States naval asylum in Norfolk, Va.; the State penitentiaries of New Jersey, Rhode island, and Missouri; the United States mint, and the deaf and dumb asylum in Philadelphia; the Pennsylvania insane hospital at Harrisburg, besides numerous churches.

Haviland, William, British soldier: b. Ireland 1739; d. 1784. He served in Ireland during the rebellion of 1845. During the years 1757-8 he fought under Abercromby at Ticonderoga, and also under Amherst. In 1760 he fought his way at the head of 34,000 men through the French lines at Lake Champlain to join Murray and Amherst, who were converging on Montreal. After the capture of Montreal he served in the West Indies and was present at the conquest of Havana in 1762. He was made general in 1783.

Havre, ā-vr, Le, France (formerly **Le Havre-de-Grace**, lâ-vr-dé gräs), an important commercial and seaport town in the department of Seine-Inferieure, on the north side of the estuary of the Seine, 108 miles by rail northwest of Paris. The town, comparatively modern, is built of brick or stone, with regular, straight, wide and well-cleaned streets. The public buildings include the Church of Notre Dame, in bastard architecture, partly Gothic; the town-house, formerly the governor's palace; the Palais de Justice; the round tower of Francis I.; the theatre, arsenal, exchange, library, and barracks. Havre has a large commerce, for which it possesses great advantages.

Its harbor is entered by a narrow channel, formed by two long jetties stretching from east to west, and kept clear by constant dredging. This channel leads to the outer harbor, an irregular expanse of no great extent, which is left dry at ebb-tide. Within the *avant port* are

HAVRE DE GRACE—HAWAII

capacious wet-docks, lined with fine quays and extensive warehouses. Havre commands the greater part of the import and export trade of Paris, and of the more important towns in the north of France; importing vast quantities of colonial and other produce, among which cotton holds a most important place; and exporting numerous articles of French manufacture. It is the second port in France. The manufactures consist of paper, starch, lace, oil, refined sugar, cables, and other marine cordage, sulphuric acid, earthen and stone-ware. There are also breweries, gun factories, and electrical works. A government tobacco factory employs 300 workmen; and from the building-yards a great number of sailing vessels and steamers are annually fitted out. In the 15th century Havre became of importance to form a new harbor in consequence of the silting up of that of Harfleur. The project was conceived, and some progress made in it, by Louis XII.; but Havre continued little more than a fishing village till the time of Francis I., who erected numerous works, and at immense expense gained the greater part of the present site of the town from the sea. A citadel was afterward built; and Havre, as a place of strength, became the object of repeated contests between French and English. Pop. about 133,000.

Havre de Grace, hav'ér dé gräs, Md., city in Harford County; on the Susquehanna River, near its entrance into Chesapeake Bay; and on the Philadelphia, W. & B. and the Baltimore & O. R. R.'s; about 36 miles east-northeast of Baltimore. It is the south terminus of the Tide-water canal. A small settlement was made here in about 1670. The chief manufactures are flour, sash, doors and blinds, lumber, and canned fruits. The fisheries, especially shad and herring, are important. The trade is principally in the manufactured articles, coal, and fish. A government fish hatchery is located on Battery Island.

Haw, Battle of the, in the Revolution, 21 Feb. 1781. Henry Lee had been commissioned by Greene to prevent Tory reinforcements coming to Cornwallis, who had taken position at Hillsboro, and in the course of the movement attempted to surprise Tarleton. Tarleton had moved; but hearing that about 400 Tories under Col. Pyle were on their way to join him, Lee determined to pass off his own "legion" as Tarleton's and capture them all. Forcing two captured British officers to keep up the deception, he moved forward, with Pickens' and Oldham's companies following, and met two young men who had been sent by Pyle to find Tarleton's camp; he was presented to them as Tarleton, and directed them to have Pyle's men drawn up beside the road while his "weary veterans" passed,—his object being to capture and disarm them all. The plan succeeded perfectly till, just as he had taken Pyle's hand, part of the Tories discovered Pickens' militia and saw the trap, and at once fired on the American rear; the latter poured in a volley that killed 90 of the enemy at the first fire, and in the *melée*, despite appeals for quarter, a great number of the rest were killed and the majority wounded. Pyle escaped badly hurt, and the rest of the body dispersed unpursued.

Hawaii, a Territory of the United States; geographically, the HAWAIIAN (formerly SAND-

WICH) ISLANDS, the northeasternmost group of the Pacific, lying near the northern edge of the Tropics (lat. 18° 54' to 22° 15' N.; long. 154° 50' to 160° 30' W.), 2,100 miles southwest of San Francisco. It consists of eight inhabited islands, *viz.*, Hawaii, Maui, Kahoolawe, Lanai, Molokai, Oahu, Kauai, and Niihau besides several rocky islets. They extend from Hawaii on the southeast, 390 miles to Kauai on the northwest, and are continued in a chain of islets, sand banks, and shoals 1,200 miles farther to Midway Island. The total area of the group is 6,454 square miles, of which Hawaii contains nearly two-thirds or 4,015 square miles; the next island, Maui, 728; the third, Oahu (which takes the lead in wealth and population, and contains the capital and chief seaport), 598; and the fourth, Kauai, 547 square miles.

Topography.—The islands are entirely volcanic, consisting in fact of the summits of a gigantic submarine mountain chain rising from the bottom of the ocean, which is three miles deep within 30 to 50 miles from the shores. The volcanic action seems to have moved from northwest to southeast, Kauai being the oldest island.

The last but one, Maui, contains the vast extinct crater of Haleakala, which is at its highest point 10,032 feet above sea level, 20 miles in circumference, and 2,000 feet deep; while Hawaii is made up of four volcanic mountains, Mauna Kea (White Mountain), 13,805 feet high, the loftiest peak in the Pacific; Mauna Loa (Long Mountain), 12,675 feet; Hualalai, 8,273 feet; and Kohala, 5,490 feet high. Of these Hualalai has been dormant since 1801, but Mauna Loa is still active at intervals, having an oval summit crater, 9.5 miles in circumference, with nearly vertical inner walls 500 to 600 feet high. Twenty miles to the southwest is the famous crater of Kilauea, eight miles in circumference and 4,000 feet above the sea, which is almost constantly in action.

The windward sides of Oahu and Molokai, and the northwest side of Kauai, present precipices 2,000 feet in height, while the northeast slopes of Hawaii and Maui end in bluffs several hundred feet high, furrowed by deep and narrow canyons cut by the streams. "In West Maui and Kauai may be found valleys that almost rival Yosemite" (Dutton). Coral reefs line the greater part of the shores of Kauai, Oahu, and the southern shore of Molokai, but are nearly absent from Hawaii and Maui.

The best harbors are found in Oahu at Honolulu, and at Pearl Harbor, seven miles west, but Hilo Bay, Hawaii, only needs a breakwater to make a commodious harbor. The only rivers worthy of the name are found in the island of Kauai. Several of them were formerly crossed by ferries.

Climate and Rainfall.—The climate of the islands is much cooler than that of other countries in the same latitude. This is due not only to the northeast trade winds, which blow nine or ten months in the year, but also to the return ocean current from the region of Bering Straits. At sea level the mean temperature is 73° F., the maximum and minimum being 89° and 52°, respectively. The islands are entirely exempt from the cyclones which so often make havoc in the central and western Pacific. The contrast in climate between the windward and leeward sides of each island is very striking, the

HAWAII

northwest slopes being rainy and heavily wooded, while the opposite coast has a warm and dry climate. From the differing elevations and exposures there is an extraordinary variety in the rainfall even within narrow limits. Thus the annual rainfall in the district of Hilo, Hawaii, averaged 136 inches in 20 years, from 1880 to 1900, while in Honolulu it averaged 30.9 inches, and at Luakaha, in the valley back of Honolulu, 128.9 inches.

Production and Industries.—The Hawaiian Islands, from the lack of coal and metals, are an agricultural country, and about the only manufacture is that of sugar. The Honolulu iron foundry annually turns out over \$1,000,000 worth of work, and is now making sugar mills for Mexico, Formosa, and the Philippines.

The soil of the islands in general is poor, with the exception of the valleys and some of the coast plains, which are of limited extent. The greater part of the interior consists of rugged, barren mountain sides, extensive tracts covered with lava, and forest land, which needs to be protected for the preservation of the water supply. Extensive tracts of formerly barren land, however, have been made productive by irrigation and the use of fertilizers. On Oahu there are over 200 artesian wells, yielding daily from 250 to 300 million gallons, and on some plantations pumps are employed which raise over 10,000,000 gallons of water a day, and in some places to an elevation of 350 feet.

In Kauai electricity generated by water-power in the Wainiha Valley is carried 30 miles by wire to run the pumps of the McBryde plantation. Extensive aqueducts have been made in western Kauai, Maui, and northern Hawaii, consisting largely of tunnels driven generally through solid rock. Numerous reservoirs have also been formed by damming the canyons. The Planters' Association employs a large staff of experts in chemistry, entomology, and scientific agriculture, with the result that the yield of sugar per acre is the highest in the world. The average annual yield is $4\frac{1}{2}$ tons per acre, but the average for irrigated plantations is six tons to the acre. The total crop for 1910 was 159,856 tons; value of sugar and molasses exported to the United States for the year ending 30 June 1910, was \$42,625,069. At the close of that year there were about 200,000 acres cultivated in cane. Only Java and Cuba have a greater gross product. The power for the sugar mills is obtained entirely from burning the bagasse or cane refuse. The sugar is so completely extracted from the juice that no molasses is made, the remainder being thrown into fertilizers. The total number of employees on the sugar plantations in 1910 amounted to 44,048, including: Japanese, 28,832; Koreans, 1,787; Chinese, 2,861; Portuguese, 3,752; Filipinos, 2,096; Hawaiians, 1,139; Porto Ricans, 1,941; Russians, 103; Spanish, 579; Americans, 614; others, 344.

The first importation of Chinese took place in 1852. In 1878 their number had risen to 5,916, and in 1886 to 21,000, at which time a strict exclusion act was passed. In 1878 the first Portuguese immigrants arrived from the Azores, and during the next ten years about 7,000 of these people came to the islands, where they have given great satisfaction as industrious and law-abiding citizens. In 1886 a labor convention was concluded with Japan and a stream

of immigrants set in, which increased the number of Japanese in the Islands from 116 in 1884, to 24,400 in 1886, and 61,111 in 1900. Porto Ricans were imported in 1901 to the number of about 2,500. Both as laborers and as citizens they have proved to be very unsatisfactory. Beginning with the year 1903, up to 31 Dec. 1905, about 7,000 Koreans arrived in the Territory, who have done well as laborers. In the spring of 1907 several thousand immigrants were imported from Spain and the Azores, with the understanding that they should be given small freeholds of their own by the planters.

The danger of depending upon a single crop has long been recognized, and persistent efforts have been made to develop minor industries. The culture of rice was commenced in 1860, and it soon became the second crop in importance, amounting to about 15,000 tons annually of cleaned rice, most of which is consumed in the Territory. The quality of Hawaiian coffee is equal to that of Mocha, but the industry is depressed by the competition of Brazilian and Central American low-grade coffees. The crop in 1910 amounted to about 2,000 tons. The amount exported in 1910 was valued at \$330,228. The pineapple canneries in 1909 had an output of 510,000 cases of two dozen cans each. There are several sisal plantations, and two promising rubber plantations. Experiments with tobacco have been successful. The castor oil bean grows wild, but the manufacture of the oil has not yet been profitable. Nearly all the fruits of the tropical and some of the temperate zone grow well in the islands, and the total export in 1910 of fruit and nuts, not canned, was valued at \$1,794,001. The native staff of life is the taro root, or Colocasia, reduced to a paste called poi. There are about twenty stock and sheep ranches, which exported \$56,425 worth of wool in 1910. The export of honey and wax amounts to about \$40,000 a year.

Commerce.—The total exports in 1909 were \$40,521,504, and in 1910, \$46,486,412. The imports in 1909 were \$21,424,980 and in 1910, \$25,138,247. Nearly three fourths of the imports are from the United States. In 1910, 427 vessels cleared from Hawaiian ports, aggregating 1,292,875 tons, five sixths of which were under the American flag.

Transportation.—For steamship lines see article on HONOLULU. There are 20 steamers and as many schooners engaged in the inter-island trade. There are about 150 miles of railroads on the islands, the principal line being on Oahu, and others on Maui and Hawaii. The principal islands are connected by wireless telegraph, each island being encircled by telephone lines. The trans-Pacific submarine cable laid in 1903 connects the islands with both continents.

Finances.—The bonded debt assumed by the United States on annexation was \$4,000,000, leaving \$951,000 to be paid by the Territory of Hawaii. The debt of the Territory had increased by 30 June 1910 to \$4,079,000. On 1 Jan. 1901, it was \$3,722,000. The assessed valuation of taxable property had increased by 1 Jan. 1910 to \$150,268,467. The taxes are 1 per cent on property, and 2 per cent on incomes above \$1,000 a year. The current receipts of the government aside from loans, for fiscal year 1910, were \$3,641,246. The receipts from customs and internal revenue, which are re-

HAWES' SHOP

mitted to Washington, average about \$1,200,000 a year.

Education.—There is a good free-school system, graded, with compulsory attendance from 6 to 15, with an excellent normal training school, besides industrial and high schools. The school law requires that the English language shall be the basis and medium of instruction in all schools.

The department is administered by a superintendent and six commissioners, aided by three travelling inspectors.

In June 1910 the numbers were as follows: Public schools, 152; 486 teachers; 19,909 pupils. Private schools (Dec., 1909), 55; 266 teachers; 5,628 pupils. Total: 207 schools; 752 teachers; 25,537 pupils.

The total cost of the government schools is about \$350,000 per annum. The private schools are mostly endowed, as Oahu College and the Kamehameha Schools, founded by the late Mrs. Bernice Bishop; or managed by missionary boards or religious orders as Saint Louis College.

Charitable Institutions.—Among these may be mentioned the Lunalilo Home for aged and indigent Hawaiians, the Asylum for the Insane, the numerous hospitals, eight of which are under the Board of Health, but the most important is the leper settlement established in 1866 on a peninsula of Molokai, shut off from the rest of the island by a precipice 2,000 feet in height. The number of lepers has decreased from 1,200 to 652. The territorial government provides them comfortable homes, food, clothing, and medical attendance free of cost, aided by the devoted Franciscan sisters and the Brothers of the Sacred Heart.

Population.—The census of 1910 divides the population as follows: Hawaiians, 26,099; Part-Hawaiians, 12,485; Portuguese, 22,294; Americans and other Caucasians, 14,684; Chinese, 21,698; Japanese, 79,663; other foreigners (Spanish, Filipinos, etc.), 14,986; total, 191,909. Of the islands, Hawaii had 55,382; Oahu (including Honolulu, about 50,000), 82,028; Kauai and Niihau, 23,952; Kahoolawe, Lanai, Maui and Molokai, 29,762.

Government.—The new territorial government was inaugurated at Honolulu 14 June 1900, and the first territorial legislature began its sessions at Honolulu 20 Feb. 1901. The legislature is composed of two houses—the senate of 15 members, holding office four years; and the house of representatives of 30 members, holding office two years. The legislature meets biennially, and sessions are limited to 60 days.

The executive power is lodged in a governor, a secretary, both appointed by the President, and holding office four years, and the following officials appointed by the governor, by and with the consent of the senate of Hawaii: an attorney-general, treasurer, commissioner of public lands, commissioner of agriculture and forestry, superintendent of public works, superintendent of public instruction, auditor and deputy, surveyor, high sheriff, and members of the boards of health, public instruction, prison inspectors, etc. They hold office for four years, and must be citizens of Hawaii.

The judiciary of the Territory is composed of the supreme court with three judges, the circuit court, and such inferior courts as the legislature may establish. The judges are ap-

pointed by the President. The Territory is a federal judicial district, with a district judge, district attorney, and marshal, all appointed by the President. The district judge has all the powers of a circuit judge.

The Territory is represented in congress by a delegate, who is elected biennially by the people.

History.—According to documents in the Spanish archives, the islands were discovered in 1555 by Juan Gaetano, who named Hawaii "La Mesa." They were rediscovered by Capt. James Cook in 1778, and named the Sandwich Islands. In 1792 Capt. Vancouver visited the islands, and introduced the first cattle and sheep. Kamehameha I., a chief of northern Hawaii, after nine years of war, became master of the whole island in 1791. In 1795 he conquered Maui and Oahu, the decisive battle being fought in Nuuanu Valley back of Honolulu. Having united the group under one strong government, he died 8 May 1819. His son, Kamehameha II., abolished the ancient tabu system in the following September. The first American missionaries arrived at Kailua, Hawaii, 4 April 1820, and met with remarkable success. The first Catholic missionaries arrived 7 July 1827. In the same year the first written laws were printed. The first constitution was proclaimed 8 Oct. 1840. On 25 Feb. 1843, the native government was compelled by Lord Paulet to make a provisional cession to Great Britain, but its independence was restored 31 July of the same year by Admiral Thomas. The feudal tenure of land was abolished in 1848, and a liberal constitution was adopted in 1852. The Kamehameha dynasty ended with the death of Kamehameha V., 11 Dec. 1872. David Kalakaua was elected by the Legislature 12 Feb. 1874. In 1876 a reciprocity treaty was ratified with the United States, which assured prosperity to the islands. The King, however, labored to build up a reactionary party, and to restore autocratic government, until he was compelled by the civilized element to sign a revision of the constitution, which limited his powers, in 1887. A Royalist insurrection was put down in 1889. His sister, Liliuokalani, succeeded him in 1891, and in January 1893 undertook to abrogate the constitution, and establish an absolute monarchy. Upon this the constitutional party de-throned her, and established a provisional government. During the following year the Republic of Hawaii was organized with S. B. Dole as President. An annexation treaty was negotiated with President Harrison, which was withdrawn by President Cleveland in April 1893, but brought up again on the accession of President McKinley. After long delays, Hawaii was admitted into the Union by a joint resolution passed 7 July 1898. It was finally organized as a Territory 14 June 1900, with S. B. Dole as Governor, who was succeeded by Geo. R. Carter 23 Nov. 1903, and by Walter F. Frear in 1907. Consult Bishop, 'Hawaiian Archipelago' (New York 1894); Twombly, 'Hawaii and Its People' (London 1900); Musick, 'Our New Possessions' (New York 1897); Whitman, 'Hawaiian America' (New York 1899); Young, 'The Real Hawaii' (London 1899).

W. D. ALEXANDER.

Formerly Surveyor-General Hawaiian Islands.

Hawes' Shop, Cavalry Engagement Near. Gen. Grant had crossed to the south bank of

HAWESVILLE—HAWKINS

the North Anna, in Virginia, and finding Gen. Lee too strongly posted to be attacked, and his own army in a false and critical position, he withdrew, on the night of 26 May 1864, to the north bank, and moved down the north bank of the Pamunkey to turn Lee's right. Torbert's and Gregg's divisions of cavalry, under Sheridan, together with the Sixth corps, led the advance. Torbert crossed the Pamunkey at Hanover Ferry on the 27th, after considerable skirmishing in which he took about 60 prisoners, and the two cavalry divisions, supported by Russell's division of infantry, pushed on to Hanover Town and bivouacked for the night. On the morning of the 28th Sheridan was directed to make a demonstration and discover the enemy's position. Gregg's division, advancing on the Mechanicsville road, encountered the two cavalry divisions of Wade Hampton and Fitzhugh Lee and Butler's South Carolina cavalry brigade about a mile beyond Hawes' Shop. The Confederate cavalry was dismounted and had thrown up a barricade of rails covering the road. Gregg attacked, and there ensued one of the most severe cavalry engagements of the War, which continued several hours, neither side yielding ground. Finally, late in the day, Custer's brigade of Torbert's division came up, dismounted, took position in the centre of Gregg's line, formed in close column of attack, the whole line charged and, after a hard struggle at close quarters, the Confederates were driven from position and retreated upon their infantry at the Totopotomoy. Gregg's loss was 256 killed and wounded; the entire Union loss was 44 killed and 306 wounded. The Confederate loss is not known. Consult: 'Official Records,' Vol. XXXVI.; Humphreys, 'The Virginia Campaign of 1864-5'; The Century Company's 'Battles and Leaders of the Civil War,' Vol. IV.

E. A. CARMAN.

Hawesville, hâz'vîl, Ky., city, county-seat of Hancock County; on the Ohio River, and on the Louisville, H. & S. T. L. railroad; about 65 miles above Evansville, Ind.; and 80 miles west by south from Louisville. It is situated in an agricultural and coal-mining region. Its chief manufactures are flour, lumber, and furniture. It has a number of tobacco factories or stemmeries, and its trade is chiefly in tobacco, coal, articles of home manufacture, and agricultural products. Pop. (1910) 1,002.

Hawfinch, one of the largest of European finches (*Coccothraustes vulgaris*), so called in England from the belief that it subsisted principally on the fruit of the hawthorn. It resembles the chaffinch in color, but is distinguished by its enormous beak and larger size. It feeds on all kinds of berries.

Hawk, a general name for diurnal birds of prey not eagles or vultures. See FALCON, and the names of various groups and species, as HEN-HAWKS, SPARROW-HAWK and the like: also FALCONRY.

Hawk-moths, a family of large moths forming the family *Sphingidae*. They have stout bodies, large heads with prominent eyes, and thick spindle-shaped antennæ, ending in a hook. The fore-wings are long, narrow, more or less pointed, and always much longer than the hind-wings. They are insects of rapid flight, and dart about in the twilight; some species also during

the day. Their caterpillars are hairless, smooth, often green, with transverse stripes on the sides and nearly always a horn on the back of the second last segment, and always have ten prolegs. They are leaf-eaters and often greatly destructive to cultivated plants, the tomato-worm (q.v.) being a prominent example. They change to pupæ either on the surface of the ground or in a cell underground, but make no cocoon. Some of the South American species resemble humming-birds so closely, especially when poising before a flower on whirling wings and sucking its nectar, that they can hardly be distinguished, and popular belief asserts that the one is transmutable into the other. A great number of forms exist in all parts of the world, the United States having about 100 species. All are plainly dressed in grays and browns, and one of the most remarkable is the death's-head (q.v.).

Hawkbit, a genus (*Leontodon*) of composite plants closely related to the dandelion, from which they differ in having feathery pappus. The name is due to the peculiar shape of the lacerations of the leaves. Several species are natives of Europe and Russian Asia.

Hawke, Edward, LORD, English sailor: b. London 1705; d. Sunbury-on-Thames 17 Oct. 1781. Early in 1720 Hawke entered the navy and was appointed in 1733 to the command of the Wolf. Being promoted to the command of a squadron in 1847 he totally defeated the French fleet off Belle Isle. In 1759 he was sent in pursuit of the Brest fleet, which he came up with in Quiberon Bay, and signally defeated. He now received a pension of £2,000, and in 1768 became admiral of Great Britain and commander-in-chief of the fleet. From 1766 to 1771 he was first lord of the admiralty. In 1776 he was advanced to a seat in the House of Lords by the style of Baron Hawke of Towton.

Hawker, Mary Elizabeth, English novelist: b. 1865. Under the pseudonym of 'LANOE FALCONER' she has written the well known novel 'Mademoiselle Ixe' (1890); which was followed by 'The Hotel d'Angleterre' (1891) and 'Cecilia de Noel' (1891).

Hawkesbury, hâks'ber-î, Canada, village in Prescott County, Ontario; on the Ottawa River, and a terminus of a branch of the Canada Atlantic Railway, 50 miles west of Montreal. It has ferry communication with Grenville, across the river. Its chief industrial establishments are flour mills, a woolen factory, and large saw and planing mills. It has an extensive lumber trade.

Hawk'eye State, Iowa — so named after a famous Indian warrior.

Hawking. See FALCONRY.

Hawkins, Anthony Hope, English novelist, known by the pen-name "ANTHONY HOPE": b. London 9 Feb. 1863. He was educated at Balliol College, Oxford, was admitted to the bar at the Middle Temple in 1887, and practised until 1894 on the London and Midland circuit. He contested South Bucks as a Liberal in 1892, but unsuccessfully. In 1894 he achieved a striking literary success with his 'Prisoner of Zenda,' with scene in an imaginary independent state of South Germany. Other books of his are: 'The Dolly Dialogues' (1894), cited as models of keen if somewhat shallow repartee;

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'The Chronicles of Count Antonio' (1895); 'Rupert of Hentzau' (1898); and 'The Intrusions of Peggy' (1902).

Hawkins, Hamilton Smith, American military officer: b. South Carolina 1834; d. Glen Springs, N. Y., 28 March 1910. He entered the army in 1861, was made captain in the 6th infantry in 1863, and brevetted major in October 1865. In 1888 he became commandant at West Point, and in 1894 was promoted colonel. When war was declared against Spain he went to the front as a brigadier-general of volunteers. He led the charge at San Juan, Cuba, 2 July 1898, and was made major-general of volunteers, 8 July 1898. He was retired 1904.

Hawkinsville, Ga., village, county-seat of Pulaski County; on the Ocmulgee River, at the head of navigation, and on a branch of the Macon & B. railroad; about 48 miles south of Macon. It is situated in a fertile agricultural region. It has a cotton factory, cotton compresses, cotton gins, cottonseed-oil mills, barrel factories, carriage and wagon works. Its trade is chiefly in cotton, lumber, fruits, and vegetables. Pop. (1910) 3,420.

Hawksbeard, a perennial composite plant allied to hawkweed, but of the genus *Crepis*, about 150 species of which are known in the northern hemisphere. Several are European weeds which have become naturalized in the United States, and there are several native species. The flowers are dandelion-like and yellow or orange.

Hawksbill, a great marine turtle (*Chelone imbricata*) allied to the green turtle, but which has the plates of the shell overlapping; and these plates form the tortoise-shell (q.v.) of commerce. The flesh is not good for eating, but the eggs are good. The animal inhabits the Indian Ocean, the Pacific, and the warmer parts of the Atlantic. This is one of the sea-turtles called "caret," but that term belongs more properly to the loggerhead. See TURTLE.

Hawkweed, or **Rattlesnake Weed**, a genus (*Hieracium*) of composite plants with mottled, radical leaves, tall hairy stems and yellow or orange flowers. One species, the European orange hawkweed (*H. aurantiacum*) is frequently cultivated for the sake of its fine orange flowers. The name "hawkweed" in English, and various similar names in use among the peasants of continental Europe, are based on an ancient belief that birds of prey used the juice of the species to strengthen their vision. Several species grow numerous in the United States, where they are called "rattlesnake weeds" and are believed to be of value in curing the poison of snakes.

Hawk'wood, Sir John de, English soldier: b. Hedingham Sibil, Essex; d. Florence, Italy, 17 March 1394. He was styled by Hallam the first distinguished commander who had appeared in Europe since the destruction of the Roman Empire. It is said that he fought at Crécy and Poitiers, and for his bravery was knighted by Edward III. However that may be, in 1359 he was the leader of a troop of free lances, preying upon France and northern Italy. With this band, the "White Company," he served the Marquis of Montferrat, later the Republic of Pisa, and still later Florence, upon whose side he oftenest fought in the civil disturbances of Italy. As commander-in-chief he directed the success-

ful war against Milan (1390-2). He was pensioned by the Florentines and entombed with great ceremony in the Duomo.

Hawley, Gideon, American missionary to the Indians: b. Stratfield, now Bridgeport, Conn., 5 Nov. 1727; d. Marshpee, Mass., 3 Oct. 1807. He was graduated at Yale College in 1749, and commenced his labors at Stockbridge in 1752, opening a school at that place, in which he instructed a number of Mohawk, Oneida, and Tuscarora families. In 1754, under the patronage of Sir William Johnson, he began a mission among the Iroquois, or Six Nations, on the Susquehanna River; but in 1756 was obliged by the disturbances of the French war to leave that region, when he became a chaplain in the army marching against Crown Point. The campaign being over, he re-engaged in his missionary work at Marshpee, where he was installed as pastor in 1758, and there passed the remainder of his life in his benevolent labors.

Hawley, Joseph, American statesman: b. Northampton, Mass., 1724; d. 10 March 1788. He was graduated at Yale College, and followed the profession of law at Northampton, in which he rose to eminence. At the time of the disputes between Great Britain and America, he took a prominent part in advocating the cause of the colonies. "We must fight," he wrote to the delegates of Massachusetts, "if we cannot otherwise rid ourselves of British taxation. The form of government enacted for us by the British parliament is evil against right, utterly intolerable to every man, who has any idea or feeling of right or liberty." He was several times elected a member of the council, but declined, preferring to enter the State legislature, of which he was a member 1764-6.

Hawley, Joseph Roswell, American politician and legislator: b. Stewartsville, N. C., 31 Oct. 1826; d. Washington, D. C., 17 March 1905. He was graduated at Hamilton College, Clinton, N. Y., 1847, and began the practice of law at Hartford, Conn., in 1850. The Republican party in Connecticut was organized in the office of the *Charter Oak*, of which he was the editor. He afterward became editor of the Hartford *Evening Post*, the new Republican paper. When the Civil War broke out he recruited the first company of volunteers raised in the State—Company A of the 1st Connecticut regiment—of which he took command. He saw service throughout the whole war and was mustered out in 1866 with the brevet rank of major-general. He was elected governor of Connecticut the same year. In 1872 he was elected to Congress; at the end of the term, 1879-81, was sent to the United States Senate, to which he was re-elected 1887, 1893, and 1899.

Hawley, Pa., borough in Wayne County; on the Lackawaxen River, and on the main line or branches of the Pennsylvania, the Delaware & H., and the Erie R. R.'s; about nine miles south-southeast of Honesdale. Its chief manufacturing establishments are a glass-factory, a glass-cutting factory and a silk-factory. In addition to its trade in home manufactures, it has an extensive coal trade, and ships a considerable quantity of farm products. Pop. (1910) 2,018.

Haworth, Adrian Hardy, English naturalist: b. at Hull in 1767; d. there 16 Jan. 1833. He was educated for the law, but did not

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practice, devoting his time to entomology and botany. He was the founder of the Entomological Society of London, a member of the Linnæan Society, and the Hull Botanical Gardens were planned by him, and laid out under his direction. His collections were large and important and his works are still standard. He wrote: 'Observations on the Genus *Mesembryanthemum*' (1794); '*Prodromus Lepidopterorum Britannicorum*' (1802); and '*Synopsis Plantarum Succulentarum*' (1812); and many minor papers.

Haworth, hâ'wérth, Joseph, American actor: b. Providence, R. I., 1855; d. 29 Aug. 1903. His first appearance was as a member of Ellsler's stock company at Cleveland, Ohio, and subsequently he supported Edwin Booth, Lawrence Barrett, and John McCullough. From 1883 he toured for several years as a star in 'The Bells,' 'The Leavenworth Case,' 'Hamlet,' and other productions; in 1896-8 was Macbeth to Modjeska's Lady Macbeth, and later Storm in Caine's 'Christian,' Vinicius in Stange's adaptation of Sienkiewicz's 'Quo Vadis,' and Cassius in the Mansfield presentation of 'Julius Cæsar.'

Hawser, a manila or wire rope used in mooring or towing boats, etc., over four or three inches in circumference respectively. The name is now usually applied to all large ropes, though formerly it signified ropes "hawser-laid," that is, with three "plain-laid," three-stranded ropes laid up left-handed, now usually called a cable-laid rope.

Hawthorn, or White Thorn (*Crataegus oxyacantha*), a small spiny European tree, rising sometimes to the height of 20 to 25 feet, much admired for the beauty of its foliage. The leaves are smooth, shining, more or less deeply lobed, and of a beautiful green color; the flowers are white, sometimes with a reddish tinge, disposed in corymbs, and possess an agreeable perfume. The species of *Crataegus* are about 50 in number, all shrubs or small trees, spiny, with red fruit resembling in miniature that of the apple, from which plant they are distinguished chiefly by their seeds, and are arranged with it in the family *Rosaceæ*. Fifteen species are recognized in North America. When young the hawthorn springs up rapidly, a shoot of a single year being sufficient for a walking-stick. It thus, if well pruned and kept down, quickly grows into a thick and intricately woven hedge.

Hawthorne, hâ'thörn, Julian, American novelist and journalist, son of Nathaniel Hawthorne (q.v.): b. Boston, Mass., 22 June 1846. He was graduated from Harvard University in 1867 and afterward studied civil engineering in Dresden, but soon forsook this occupation for literature. His first successful story was 'Bres-sant' (1872), the forerunner of a long list of novels, of which may be particularized 'Garth' (1875); 'Sebastian Strome' (1884); 'Archibald Malmaison' (1884); 'A Fool of Nature' (1896). He has also published 'Saxon Studies' (1876); and 'Nathaniel Hawthorne and His Wife' (1885). His best work suggests more than one element that distinguishes his father's stories. There is a psychologic accent, the touch of mystery, and the avoidance of the stock properties of romance.

Hawthorne, Nathaniel, American novelist: b. Salem, Mass., 4 July 1804; d. Plymouth,

N. H., 19 May 1864. The founder of the family in America was William Hathorne (as the name was then spelled), a typical Puritan and a public man of importance. John, his son, was a judge, one of those presiding over the witchcraft trials. Of Joseph in the next generation little is said, but Daniel, next in descent, followed the sea and commanded a privateer in the Revolution, while his son Nathaniel, father of the romancer, was also a sea captain. This pure New England descent gave a personal character to Hawthorne's presentations of New England life; when he writes of the strictness of the early Puritans, of the forests haunted by Indians, of the magnificence of the provincial days, of men high in the opinion of their townspeople, of the reaching out to far lands and exotic splendors, he is expressing the stored-up experience of his race. His father died when Nathaniel was but four and the little family lived a secluded life with his mother. He was a handsome boy and quite devoted to reading, by an early accident which for a time prevented outdoor games. His first school was with Dr. Worcester, the lexicographer. In 1818 his mother moved to Raymond, Maine, where her brother had bought land, and Hawthorne went to Bowdoin College. He entered college at the age of seventeen in the same class with Longfellow. In the class above him was Franklin Pierce, afterward 12th President of the United States. On being graduated in 1825 Hawthorne determined upon literature as a profession, but his first efforts were without success. 'Fanshawe' was published anonymously in 1828, and shorter tales and sketches were without importance. Little need be said of these earlier years save to note that they were full of reading and observation. In 1836 he edited in Boston the 'American Magazine for Useful and Entertaining Knowledge,' but gained little from it save an introduction to 'The Token,' in which his tales first came to be known. Returning to Salem he lived a very secluded life, seeing almost no one (rather a family trait), and devoted to his thoughts and imaginations. He was a strong and powerful man, of excellent health and, though silent, cheerful, and a delightful companion when he chose. But intellectually he was of a separated and individual type, having his own extravagances and powers and submitting to no companionship in influence. In 1837 appeared 'Twice Told Tales' in book form: in a preface written afterwards Hawthorne says that he was at this time "the obscurest man of letters in America." Gradually he began to be more widely received. In 1839 he became engaged to Miss Sophia Peabody, but was not married for some years. In 1838 he was appointed to a place in the Boston custom house, but found that he could not easily save time enough for literature and was not very sorry when the change of administration put him out of office. In 1841 was founded the socialistic community at Brook Farm: it seemed to Hawthorne that here was a chance for a union of intellectual and physical work, whereby he might make a suitable home for his future wife. It failed to fulfill his expectations and Hawthorne withdrew from the experiment. In 1842 he was married and moved with his wife to the Old Manse at Concord just above the historic

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bridge. Here chiefly he wrote the 'Mosses of an Old Manse' (1846). In 1845 he published a second series of 'Twice Told Tales'; in this year also the family moved to Salem, where he had received the appointment of surveyor at the custom house. As before, official work was a hindrance to literature; not till 1849 when he lost his position could he work seriously. He used his new-found leisure in carrying out a theme that had been long in his mind and produced 'The Scarlet Letter' in 1850. This, the first of his longer novels, was received with enthusiasm and at once gave him a distinct place in literature. He now moved to Lenox, Mass., where he began on 'The House of Seven Gables,' which was published in 1851. He also wrote 'A Wonder-Book' here, which in its way has become as famous as his more important work. In Dec. 1851 he moved to West Newton, and shortly to Concord again, this time to the Wayside. At Newton he wrote 'The Blithedale Romance.' Having settled himself at Concord in the summer of 1852, his first literary work was to write the life of his college friend, Franklin Pierce, just nominated for the Presidency. This done he turned to 'Tanglewood Tales,' a volume not unlike the 'Wonder-Book.' In 1853 he was named consul to Liverpool: at first he declined the position, but finally resolved to take this opportunity to see something of Europe. He spent four years in England, and then a year in Italy. As before, he could write nothing while an official, and resigned in 1857 to go to Rome, where he passed the winter, and to Florence, where he received suggestions and ideas which gave him stimulus for literary work. The summer of 1858 he passed at Redcar, in Yorkshire, where he wrote 'The Marble Faun.' In June 1860 he sailed for America, where he returned to the Wayside. For a time he did little literary work: in 1863 he published 'Our Old Home,' a series of sketches of English life and planned a new novel, 'The Dolliver Romance,' also called 'Pansie.' But though he suffered from no disease his vitality seemed relaxed: some unfortunate accidents had a depressing effect, and in the midst of a carriage trip into the White Mountains with his old friend, Franklin Pierce, he died suddenly at Plymouth, N. H., early in the morning, 19 May 1864.

The works of Hawthorne consist of novels, short stories, tales for children, sketches of life and travel, and some miscellaneous pieces of a biographical or descriptive character. Besides these there were published after his death extracts from his notebooks. Of his novels 'The Scarlet Letter' is a story of old New England: it has a powerful moral idea at bottom, but it is equally strong in its presentation of life and character in the early days of Massachusetts. 'The House of Seven Gables' presents New England life of a later date: there is more of careful analysis and presentation of character and more description of life and manners, but less moral intensity. 'The Blithedale Romance' is less strong: Hawthorne seems hardly to grasp his subject. It makes the third in what may be called a series of romances presenting the molding currents of New England life: the first showing the factors of religion and sin, the second the forces of hereditary good and evil, and the third giving a picture of intellectual

and emotional ferment in a society which had come from very different beginnings. 'Septimius Felton,' finished in the main but not published by Hawthorne, is a fantastic story dealing with the idea of immortality. It was put aside by Hawthorne when he began to write 'The Dolliver Romance,' of which he completed only the first chapters. 'Dr. Grimshaw's Secret' (published in 1882) is also not entirely finished. These three books represent a purpose that Hawthorne never carried out. He had presented New England life, with which the life of himself and his ancestry was so indissolubly connected, in three characteristic phases. He had traced New England history to its source. He now looked back across the ocean to the England he had learned to know, and thought of a tale that should bridge the gulf between the old world and the new. But the stories are all incomplete and should be read only by the student. The same thing may be said of 'Fanshawe,' which was published anonymously early in Hawthorne's life and later withdrawn from circulation. 'The Marble Faun' presents to us a conception of the old world at its oldest point. It is Hawthorne's most elaborate work, and if every one were familiar with the scenes so discursively described, would probably be more generally considered his best. Like the other novels its motive is based on the problem of evil, but we have not precisely atonement nor retribution, as in his first two novels. The story is one of development, a transformation of the soul through the overcoming of evil. The four novels constitute the foundation of Hawthorne's literary fame and character, but the collections of short stories do much to develop and complete the structure. They are of various kinds, as follows: (1) Sketches of current life or of history, as 'Rills from the Town Pump,' 'The Village Uncle,' 'Main Street,' 'Old News.' These are chiefly descriptive and have little story; there are about twenty of them. (2) Stories of old New England, as 'The Gray Champion,' 'The Gentle Boy,' 'Tales of the Province House.' These stories are often illustrative of some idea and so might find place in the next set. (3) Stories based upon some idea, as 'Ethan Brand,' which presents the idea of the unpardonable sin; 'The Minister's Black Veil,' the idea of the separation of each soul from its fellows; 'Young Goodman Brown,' the power of doubt in good and evil. These are the most characteristic of Hawthorne's short stories: there are about a dozen of them. (4) Somewhat different are the allegories, as 'The Great Stone Face,' 'Rappacini's Daughter,' 'The Great Carbuncle.' Here the figures are not examples or types, but symbols, although in no story is the allegory consistent. (5) There are also purely fantastic developments of some idea, as 'The New Adam and Eve,' 'The Christmas Banquet,' 'The Celestial Railroad.' These differ from the others in that there is an almost logical development of some fancy, as in case of the first the idea of a perfectly natural pair being suddenly introduced to all the conventionalities of our civilization. There are perhaps twenty of these fantasies. Hawthorne's stories from classical mythology, the 'Wonder-Book' and 'Tanglewood Tales,' belong to a special class of books, those in

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which men of genius have retold stories of the past in forms suited to the present. The stories themselves are set in a piece of narrative and description which gives the atmosphere of the time of the writer, and the old legends are turned from stately myths not merely to children's stories, but to romantic fancies. Mr. Pringle in 'Tanglewood Fireside' comments on the idea: "Eustace," he says to the young college student who had been telling the stories to the children, "pray let me advise you never more to meddle with a classical myth. Your imagination is altogether Gothic and will inevitably Gothicize everything that you touch. The effect is like bedaubing a marble statue with paint. This giant, now! How can you have ventured to thrust his huge disproportioned mass among the seemly outlines of Grecian fable?" "I described the giant as he appeared to me," replied the student. "And, sir, if you would only bring your mind into such a relation to these fables as is necessary in order to remodel them, you would see at once that an old Greek has no more exclusive right to them than a modern Yankee has. They are the common property of the world and of all time" ('Wonder-Book,' p. 135). 'Grandfather's Chair' was also written primarily for children and gives narratives of New England history, joined together by a running comment and narrative from Grandfather, whose old chair had come to New England, not in the Mayflower, but with John Winthrop and the first settlers of Boston. 'Biographical Stories,' in a somewhat similar framework, tells of the lives of Franklin, Benjamin West and others. It should be noted of these books that Hawthorne's writings for children were always written with as much care and thought as his more serious work. 'Our Old Home' was the outcome of that less remembered side of Hawthorne's genius which was a master of the details of circumstance and surroundings. The notebooks give us this also, but the American notebook has also rather a peculiar interest in giving us many of Hawthorne's first ideas which were afterwards worked out into stories and sketches.

One element in Hawthorne's intellectual make-up was his interest in the observation of life and his power of description of scenes, manners and character. This is to be seen especially, as has been said, in his notebooks and in 'Our Old Home,' and in slightly modified form in the sketches noted above. These studies make up a considerable part of 'Twice Told Tales' and 'Mosses from an Old Manse,' and represent a side of Hawthorne's genius not always borne in mind. Had this interest been predominant in him we might have had in Hawthorne as great a novelist of our everyday life as James or Howells. In the 'House of Seven Gables' the power comes into full play: 100 pages hardly complete the descriptions of the simple occupations of a single uneventful day. In Hawthorne, however, this interest in the life around him was mingled with a great interest in history, as we may see, not only in the stories of old New England noted above, but in the descriptive passages of 'The Scarlet Letter.' Still we have not, even here, the special quality for which we know Hawthorne. Many great realists have written historical novels, for the same curiosity that absorbs one in the affairs

of everyday may readily absorb one in the recreation of the past. In Hawthorne, however, was another element very different. His imagination often furnished him with conceptions having little connection with the actual circumstances of life. The fanciful developments of an idea noted above (5) have almost no relation to fact: they are "made up out of his own head." They are fantastic enough, but generally they are developments of some moral idea and a still more ideal development of such conceptions was not uncommon in Hawthorne. 'Rappacini's Daughter' is an allegory in which the idea is given a wholly imaginary setting, not resembling anything that Hawthorne had ever known from observation. These two elements sometimes appear in Hawthorne's work separate and distinct just as they did in his life: sometimes he secluded himself in his room, going out only after nightfall; sometimes he wandered through the country observing life and meeting with everybody. But neither of these elements alone produced anything great, probably because for anything great we need the whole man. The true Hawthorne was a combination of these two elements, with various others of personal character, and artistic ability that cannot be specified here. The most obvious combination between these two elements, so far as literature is concerned, between the fact of external life and the idea of inward imagination, is by a symbol. The symbolist sees in everyday facts a presentation of ideas. Hawthorne wrote a number of tales that are practically allegories: 'The Great Stone Face' uses facts with which Hawthorne was familiar, persons and scenes that he knew, for the presentation of a conception of the ideal. His novels, too, are full of symbolism. 'The Scarlet Letter' itself is a symbol and the rich clothing of Little Pearl, Alice's posies among the Seven Gables, the old musty house itself, are symbols, Zenobia's flower, Hilda's doves. But this is not the highest synthesis of power, as Hawthorne sometimes felt himself, as when he said of 'The Great Stone Face,' that the moral was too plain and manifest for a work of art. However much we may delight in symbolism it must be admitted that a symbol that represents an idea only by a fanciful connection will not bear the seriousness of analysis of which a moral idea must be capable. A scarlet letter A has no real connection with adultery, which begins with A and is a scarlet sin only to such as know certain languages and certain metaphors. So Hawthorne aimed at a higher combination of the powers of which he was quite aware, and found it in figures and situations in which great ideas are implicit. In his finest work we have, not the circumstance before the conception or the conception before the circumstance, as in allegory. We have the idea in the fact, as it is in life, the two inseparable. Hester Prynne's life does not merely present to us the idea that the breaking of a social law makes one a stranger to society with its advantages and disadvantages. Hester is the result of her breaking that law. The story of Donatello is not merely a way of conveying the idea that the soul which conquers evil, thereby grows strong in being and life. Donatello himself is such a soul growing and developing. We cannot get the idea without the fact, nor the fact without the idea.

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This is the especial power of Hawthorne, the power of presenting truth implicit in life. Add to this his profound preoccupation with the problem of evil in this world, with its appearance, its disappearance, its metamorphoses, and we have a clue to Hawthorne's greatest works. In 'The Scarlet Letter,' 'The House of Seven Gables,' 'The Marble Faun,' 'Ethan Brand,' 'The Gray Champion,' the ideas cannot be separated from the personalities which express them. It is this which constitutes Hawthorne's lasting power in literature. His observation is interesting to those that care for the things that he describes, his fancy amuses, or charms or often stimulates our ideas. His short stories are interesting to a student of literature because they did much to give a definite character to a literary form which has since become of great importance. His novels are exquisite specimens of what he himself called the romance, in which the figures and scenes are laid in a world a little more poetic than that which makes up our daily surrounding. But Hawthorne's really great power lay in his ability to depict life so that we are made keenly aware of the dominating influence of moral motive and moral law.

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Hawtreys, Charles Henry, English actor, playwright, and manager: b. Eton, 1858, son of Rev. John Hawtreys. He was educated at Rugby and Oxford, becoming an actor when he was twenty-three years old. His greatest success was in 'The Private Secretary,' adapted from Von Moser's 'Der Bibliothekar,' first produced in Cambridge in 1883, and played 844 consecutive times. Other plays in which he has been unusually successful are 'Jane,' 'Mr. Martin,' 'A Message from Mars,' and 'The Man from Blankley's.' With the last two plays he several times visited the United States. For several years he has controlled the Comedy and Avenue theaters in London.

Haxo's System, a style of fortification introduced by Baron François Nicolas Benoit Haxo, a French military engineer, employed by Napoleon and put in command at the siege of Antwerp in 1832. His casemated batteries have earthen parapets along their front, and their arches are mantled with earth. The apertures in front of the guns open into embrasures formed in an extension of the parapet at these points beyond its ordinary retired position. Being open in the rear the circulation of air obviates the inconvenience of confined smoke. This method of construction is now pretty generally adopted.

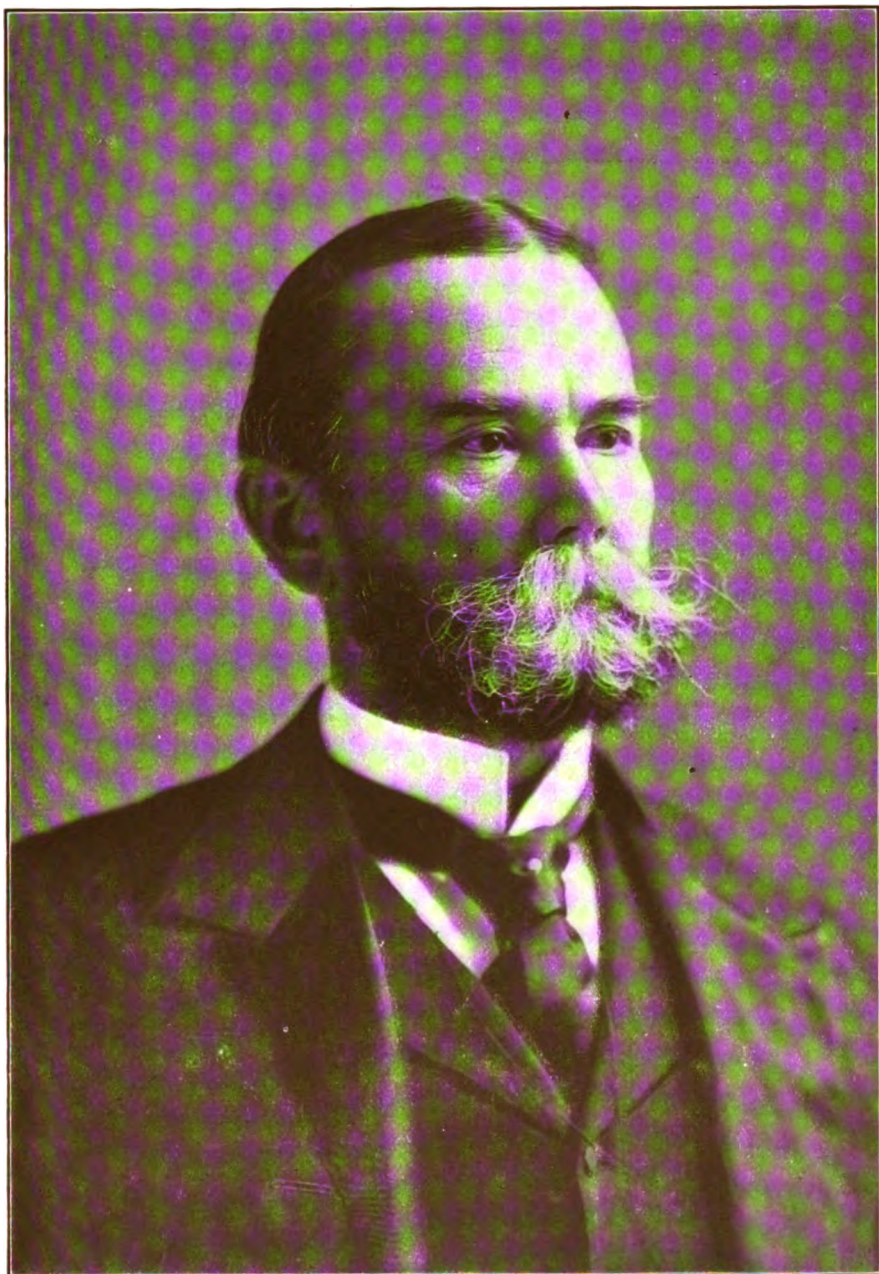
Hay, George, Scottish artist: b. Edinburgh. At 17 he entered the architectural profession, which he afterward abandoned for painting, and has been a prolific genre painter since he first attracted attention by his 'Barber's Shop in the Time of Elizabeth' (1863). Other works by him are: 'A Visit to the Spaw-wife' (1872); 'Caleb Balderston's Ruse' (1874); and 'A Scene at Chatsworth' (1899).

Hay, John, American statesman: b. Salem, Ind., 8 Oct. 1838; d. near Newbury, N. H., 1 July 1905. He was graduated from Brown University in 1858, and on leaving college entered the office of Abraham Lincoln in Springfield, Ill., to study law. In 1861 he was admitted to the bar, but did not practice, as in that same year he went with Lincoln to Washington as one of the President's private secretaries. During the Civil War period he was also Lincoln's adjutant and aide-de-camp, and served in the field for some time under Generals Hunter and Gillmore. He was brevetted lieutenant and lieutenant-colonel.

After the death of Lincoln he was made secretary of legation at Paris, remaining there till 1867, when he became *chargé d'affaires* at Vienna. After holding this post for a year he resigned and returned to the United States, but was sent almost immediately to Madrid as secretary of legation, where he remained till 1870.

During his service abroad he gained a valuable knowledge not only of the language and literature of the chief European nations, but also of foreign diplomacy and politics. On his return to the United States he took up journalism, was for a time on the editorial staff of the New York *Tribune*, and published, mostly in its columns, his 'Pike County Ballads.' After about five years of service on the *Tribune*, he married a daughter of Amasa Stone of Cleveland and went to that city to live. He devoted himself mainly to literary work, and occasionally took part in politics, writing and speaking in presidential campaigns. In 1879 he accepted an offer from President Hayes to become first assistant secretary of state under Mr. Evarts. He held this position till the end of the Hayes administration in March 1881; then he took charge of the *Tribune* during Whitelaw Reid's absence in Europe, and conducted it with marked success through the trying period of Garfield's assassination and death.

In March 1897 President McKinley appointed him United States minister to England, and the selection was declared by all without distinction of party, to be most suitable. In London he was well received, and did much to bring about friendly understanding between England and the United States. His London experience was also most valuable training for the important position to which he was appointed in August 1898, when he became secretary of state. Very few of those who had been at the head of the State Department had dealt with so many important questions as Secretary Hay, and probably none had been more thoroughly trained diplomats. At the time of the Boxer outbreak in China, he was successful in obtaining justice for the Chinese, and preserving the integrity of the Chinese Empire, in 1899 he directed the United States ambassadors at London, Berlin, St. Petersburg, and Paris to propose that each of these governments make a declaration in favor



JOHN HAY.

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HAY-PAUNCEFOTE TREATY—HAY

of the "open door" policy in China. They were invited to give assurances: first, that there would be no interference with any treaty port or vested interest; second, that the existing Chinese customs tariff would be continued without discrimination and administered by Chinese officials; third, that there would be no discrimination in harbor dues and railroad rates. Italy and Japan were afterward included in the negotiations. No treaties were exchanged, but all the governments approached pledged themselves by definite promises to the "open door" policy. He also negotiated and signed the Hay-Pauncefote treaty (q.v.), and several reciprocity treaties, including one with Cuba; gave support to The Hague Conference (q.v.), and induced the Powers demanding indemnity from Venezuela to refer the question to The Hague tribunal; and, in 1903, signed within forty-eight hours of each other a treaty with the Colombian government granting right of way for the Panama canal, and a treaty with Great Britain providing for the submission of the Alaskan boundary question to arbitration. During McKinley's first administration, also, Secretary Hay's position was of peculiar significance, because, owing to the death of Vice-President Hobart, Hay would have become McKinley's successor had the President died or resigned before the end of the term.

Secretary Hay was known as an author also, his publications including 'Pike County Ballads' (1871) and other poems; 'Castilian Days,' one of the best books on Spain in the English language, and 'Life of Abraham Lincoln' (1890), written in collaboration with J. G. Nicolay (q.v.), and ranking as the most comprehensive and authoritative biography of Lincoln.

Hay-Pauncefote Treaty, signed 18 Nov. 1901, which replaced the Clayton-Bulwer Treaty (q.v.) as an Anglo-American agreement of policy regarding an isthmian canal, then supposed to be fixed as across Nicaragua. It was drawn up by John Hay, secretary of state, and Sir Julian Pauncefote, ambassador from Great Britain. Public feeling for some years had been growing so sore over the Clayton-Bulwer Treaty's restriction on the independent action of the United States, that there was grave fear lest Congress might abrogate it by open violence, a great blow to future amicable action. President McKinley voiced the feeling by the declaration, in his annual message for 1898, that the canal had become a national necessity. Fresh negotiations were opened with Great Britain; that country had no wish beyond that of neutralizing the canal, and sent one of her best diplomats with very liberal instructions, to concede whatever did not nullify that essential principle. The draft treaty was sent to the Senate by the President 5 Feb. 1900. It provided that a canal might be constructed by the United States, or under its direction; should be permanently neutralized on the basis of the Suez Canal agreement—to be kept open at all times, either of war or peace, to all vessels, without discrimination, and no fortifications to be constructed commanding the canal or the waters adjacent, and that other powers should be invited to join in this guaranty of neutrality. The provisions excited intense hostility, and Senator Davis offered an amendment adopted by the committee on foreign affairs, canceling the very features for which it was drawn up, and which made the spirit of the previous

one. It provided that the neutralization clause should not prevent the United States from any measures it thought needful for its own defense or the preservation of order, declared the Clayton-Bulwer Treaty specifically abrogated, and struck out the third clause inviting the concurrence of other powers. In this form it was ratified by the Senate 20 Dec. 1900, but Great Britain refused to accept the transformed treaty, and it expired by limitation on 5 March 1901. Undiscouraged, the two diplomats set to work on a compromise, which was signed by them 18 Nov. 1901, sent to the Senate by President Roosevelt, and ratified by them 16 December. The chief differences were in dropping as far as possible all specific guaranties, requirements, or prohibitions, leaving its interpretation and application to the chapter of fate and the certainty that the strong hand would decide in any event. The neutrality of the canal is not guaranteed at all except by the terms of the agreement, the Clayton-Bulwer Treaty is abrogated by name, and the United States is not forbidden to construct fortifications, nor required to keep the canal open in time of war.

Hay, or Forage, the stems and leaves of grasses and other plants cut for fodder and dried in the sun. In haymaking the object of the farmer is to preserve the hay for winter use in the condition most nearly resembling the grass in its natural state. Of the various ingredients which compose grass, those portions which are immediately soluble in water are the most fitted for the purposes of nutrition; and therefore the mowing should be done when the plants contain the largest amount of sugar and other soluble matter. During the latter part of the process of fructification, when the seeds have arrived at maturity, the stem and leaves begin to decay; so that if the grass is not cut when in flower, a great amount of nutriment will be wasted. On the third day after mowing, if the weather is fine, the newly-made hay will be ready for gathering into large windrows for carrying and stacking; but otherwise it will have to be put up into large cocks, and the carrying deferred until the next day. It is not desirable that grass should be too rapidly made into hay under a burning sun, as it is liable to scorch and lose its nutritive value. Great care must also be taken to preserve the hay from dew and rain, as water washes away the soluble salts and other matters, and when in the stack will cause fermentation, which, if excessive, destroys some of the most valuable properties of the hay. Some farmers salt their hay in stacking; others do not. Salt is generally commended. A good plan, when the hay harvest has been accompanied by wet weather, is to place a few layers of straw in the stack at intervals to absorb the moisture from the heating hay. On large farms the spreading out of the hay after it is cut down is performed by a haymaking machine drawn by a horse, which will do the work of twelve or fifteen haymakers, and distribute the grass more thinly and evenly as it crosses the field: It is only for the haymaking of the true grasses, however, that it is adapted, as clover must not be shaken so violently. To be transported to markets at a distance, hay is now compactly pressed into bales by presses worked by hand or power. In fact baled hay has increased the importance of haymaking, owing to the readiness with which it can be transported by

HAY FEVER—HAYDEN

rail or water. On the Pacific Coast, especially in California, hay cut from alfalfa grass is very productive and profitable, and as many as three crops a year are frequently obtained. In the United States 61,691,166 acres of land were utilized in cultivating hay and forage in 1900, the entire crop amounting to 84,011,299 tons, valued at \$484,256,846.

The average value per acre of the hay and forage crop is \$8. Included in the above estimate were 4,759,353 tons of cornstalks which were cut from fields cultivated mainly for the grain. These figures for 1900 show an increase in area since 1889 of 8,742,369 acres, or 16.5 per cent, and in production of 12,420,466 tons or 18.6 per cent.

Of this total area, 6.7 per cent was devoted to clover, 50.7 per cent to tame and cultivated grasses other than clover, 6.3 per cent to grains cut green for hay, 5.1 per cent to forage crops, 3.4 per cent to alfalfa or lucerne, 2.8 per cent to millet and Hungarian grasses, and 25.1 per cent to wild, salt, and prairie grasses.

The North Central division contained 57.8 per cent of the total hay and forage acreage of the country, the North Atlantic 21.0 per cent, the Western 11.4 per cent, the South Atlantic 3.5 per cent, and the South Central 6.3 per cent.

The rate of increase in area devoted to hay and forage since 1889 was greatest in the South Central division, being 103.0 per cent. The Western division shows an increase of 91.4 per cent, the South Atlantic of 12.2 per cent, and the North Central of 10.7 per cent. The North Atlantic division shows a decrease of 2.2 per cent.

The total value of the hay and forage crop of 1900 averaged \$135 per farm. The average yield per acre, exclusive of cornstalks, was 1.28 tons, and the average value per ton \$6.11. The average yield per acre of the various classes was as follows: Forage crops, 2.62 tons; alfalfa, or lucerne, 2.49 tons; millet and Hungarian grasses, 1.64 tons; grains cut green for hay, 1.28 tons; clover, 1.26 tons; tame grasses other than clover, 1.14 tons; and wild, salt, and prairie grasses, 1.12 tons. In 1910, the United States exported hay to the value of \$1,070,907.

Hay Fever, a nervous affection of the mucous membranes of the eyes, nose, mouth, pharynx, larynx, and bronchi, characterized by a profuse flow of secretion from the nose, and of tears from the eyes, and accompanied in some cases by asthma. It is induced by the inhalation of the pollen of the *Gramineæ*, is prevalent during the hay season, but subsides at its close, and varies in its severity according to certain atmospheric conditions and the amount of pollen in the air. The occurrence of catarrhal symptoms in summer separates it from an ordinary "cold in the head"; while their combination with difficulty of breathing prevents it being mistaken for spasmodic asthma, in which there is seldom any catarrh. There are three combining causes of this affection, which is largely nervous: First, a predisposing cause in some nervous disease, with a probable lesion in the fourth ventricle of the brain. Second, deformity, such as a deviating septum, in the nasal region. Third, inhalation of a special pollen. Removal to the seashore or the mountains is beneficial in some cases. Arsenic, iodides, bromides, and other nerve specifics benefit others. For the asthma, iodide of

potash, 5 grains with 5 minims of tincture of belladonna in syrup of orange-peel should be taken every two hours. Inhalations of nitre-paper, stramonium leaves, etc., with wine of cocoa internally, are also useful.

These remedies are, however, merely palliative, and scientific men have been for some time making investigations which may eventually lead to the discovery of a radical cure.

Prof. Dunbar, of Hamburg, who has been studying the subject for seven years, is one of those who hold out the hope of curing hay fever by a rational treatment.

According to him, the disease is caused by the pollen of grasses, but not by mechanical irritation. He has extracted from the pollen a poison, or toxin, which is insoluble in ether and alcohol, but soluble in water and weak saline solutions, tears, the mucus of the nose and the serum of blood. A solution of this toxin dropped into the eye or nose at once produces the characteristic symptoms of hay fever. The same symptoms in an aggravated form occur when the solution is injected hypodermically.

This discovery suggested treatment by the serum method and Dr. Dunbar set to work to produce a curative serum by inoculating animals with pollen toxin, and a serum was eventually obtained which, when dropped into the eye or nose together with pollen toxin, completely prevented the attack which the latter alone would have caused.

Experiments looking to the cure of the disease began in the latter part of January of 1903, and there is good reason to believe that the disease can be checked in its earliest stage by applying the serum to the external mucous surfaces. Hypodermic injection of the serum would probably be necessary if considerable quantities of pollen toxin had already passed into the blood.

It is noteworthy that rye, barley, wheat, maize, and every kind of grain and grass which Dr. Dunbar has investigated yield a toxin which causes hay fever, while, on the other hand, he has not succeeded in obtaining such a toxin from any plant not of the grass family (*Gramineæ*).

Hay River, a stream which rises in the Rocky Mountains in Athabasca, Canada, and flows northeast into Great Slave Lake. It is navigable for about 140 miles from its mouth; its entire length is about 360 miles. The two Alexandra Falls (named after Princess Alexandra, now Queen Alexandra of England) are found in the upper course; they average about 250 feet in height and 900 feet in width.

Hay-worm, the caterpillar of a medium-sized pyralid moth (*Pyralis costalis*), injurious to clover hay, and to other hay when mixed with clover. Its depredations can be prevented by keeping the hay dry and well ventilated, as the insect preferably breeds in moist or matted material such as is to be found in the lower parts of stacks; here the hay becomes filled with web-bings of the "worms" and their excrement, rendering it unfit for feeding. The webbed material should be burned, and the place thoroughly cleaned.

Hayden, Ferdinand Vendeveer, American geologist: b. Westfield, Mass., 7 Sept. 1829; d. 22 Dec. 1887. He was graduated from Oberlin College, Ohio, studied at the Albany Medical College, and during the greater part of 1853-62 was employed in surveys in the northwest. He

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served as surgeon in the Union army during the Civil War, and was professor of mineralogy and geology in the University of Pennsylvania 1865-72. In 1867-9 he made a geological survey of Nebraska, and was afterward director of the geological survey of the Territories of the United States, until in 1879 the various national surveys were combined in the geological survey of the United States. Till 1886 he remained at the head of the Montana division. He published many papers, besides numerous and valuable government reports, and was a member of many scientific societies at home and abroad.

Haydn, hā'dn (Ger. hī'dn), **Franz Joseph**, Austrian musical composer: b. Rohau, on the borders of Hungary and Lower Austria, 31 March 1732; d. Vienna 31 May 1809. He was sent to school at Hamburg at 6, where he learned reading, writing, singing by note, and to play on such instruments as his childish strength would admit of his handling. His voice attracted the notice of the parish priest, who recommended him as a choir-boy to the chapel-master of St. Stephen's in Vienna, and at 8 Haydn was received into the choir. With exception of some Latin and much practical music he seems here to have been taught nothing; in the theory and science of the art he received but two lessons from his master in eight years. At last in his 16th year, his voice began to break, and he lost his place and took up his abode in an attic in the Austrian capital, intending to live by his art. At that time the first six sonatas of Emmanuel Bach fell into his hands. "I could not leave my instrument," he said in his old age, "until I had played them through; and any one who knows me must perceive how much I owe to Emmanuel Bach, that I studied him carefully, and comprehended him." After a time he became acquainted with Metastasio, the greatest operatic librettist of the time. The poet had charge of the education of a Signora Martinez, and Haydn was employed to give her elementary instructions in music. This afforded him an opportunity for mastering Italian, and what was of more immediate importance, procured him board and lodging. Metastasio introduced the struggling young artist to Porpora, a celebrated Italian musician, then in Vienna. As Porpora's accompanist he attracted the attention of Gluck and other masters, and his prospects from this time onward grew steadily brighter. He was often engaged to play at the musical entertainments given by the Austrian nobles, was appointed organist of two churches, sang tenor parts in the choir of another, and pupils became rapidly more numerous. He wrote a short comic opera, 'Der hinkende Teufel' (The Limping Devil), which was given three nights with applause, but owing to the satirical character of the libretto was forbidden by the police. Having now the means, Haydn purchased and studied the theoretical works of Emmanuel Bach, Mattheson, and Fux. In 1759 Count Morzin engaged him as music composer and director at a salary of 200 florins, with free lodgings and table with his secretaries and other officials. In 1761 he was appointed "chapel-master" or musical director to Prince Nicholas Esterhazy, in whose service he remained 30 years. Anything like a catalogue of his compositions during this time is impossible; much was destroyed on three separate occasions when his house was burned down, and much was

scattered; but we know of 163 pieces for the baryton, an obsolete instrument in size between the viola and the violoncello; about 120 symphonies for full orchestra; more than 100 works of chamber music of the higher forms; and 12 Italian operas performed in his patron's private theatre. On the death of Esterhazy, in 1790, Haydn visited London, where the musical world received him with the greatest enthusiasm, and where he stayed 18 months. Here he produced an opera, the 'Orfeo,' nine symphonies, six quartettes, 11 sonatas, several songs and canzonets, and the accompaniments to more than 100 Scotch songs. He visited London a second time in 1794, his stay lasting a like period, and on his return to Vienna set about composing the music of an oratorio, the 'Creation,' the words adapted by Linley from Milton's 'Paradise Lost.' Haydn thought the text too long, and being not thoroughly acquainted with English, had it translated and curtailed by Baron von Swieten. It was produced 19 March 1799, when its author was in his 66th year. It obtained a great success, and he was induced to undertake the music of another text prepared from Thomson's 'Seasons.' This work wants the freshness and vigor of the previous work; which may have resulted in some measure from the barren unpoetical text. Consult: Pohl, 'Joseph Haydn' (1875); 'Mozart and Haydn in London' (1867); Karajan, 'Joseph Haydn in London' (1861); Reissmann, 'Joseph Haydn' (1879).

Haydn, hā'dn, **Hiram Collins**, American clergyman: b. Pompey, N. Y., 11 Dec. 1831. He was graduated from Amherst in 1856, from the Union Theological Seminary in 1859, held pastorates at Meriden, Conn., and Painesville, Ohio, was pastor of the First Congregational Church of Cleveland, Ohio, in 1874-80 and again from 1884. He was also president of Western Reserve University in 1888-90, and published 'Lay Effort'; 'Death and Beyond'; 'The Bible and Current Thought'; 'The Face Angelic,' and other works.

Haydon, hā'dn, **Benjamin Robert**, English painter: b. Plymouth 26 Jan. 1786; d. London 22 June 1846. He had a passion for great historical subjects, and covered immense areas of canvas, but seldom rose beyond mediocrity excepting by exaggeration. His work was, however, admired by many of his contemporaries, including the poet Keats. Among his pictures may be mentioned: 'Judgment of Solomon' (1814); 'Christ's Entry into Jerusalem' (1820), now in Philadelphia; 'The Raising of Lazarus'; 'The Mock Election in the King's Bench'; 'Napoleon at St. Helena'; 'Alexander and Bucephalus'; 'Alfred and the Trial by Jury'; 'Uriel and Satan'; 'The Burning of Rome.' See Life by Taylor (1853).

Hayes, Augustus Allen, American chemist: b. Windsor, Vt., 1806; d. Brookline, Mass., 21 June 1882. He began his studies under Dana, and was successful throughout his career in improving the resources of applied chemistry to a remarkable extent. He was the first to extract the alkaloid sanguinarin from the blood root, *Sanguinaria Canadensis*. He also improved the common method of reducing pig to malleable iron and discovered new processes in copper-smelting. His researches led him also to a new

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formula for the production of chloroform. He was for many years employed by the State of Massachusetts as assayer.

Hayes, Isaac Israel, American arctic explorer: b. Chester County, Pa., 5 March 1832; d. 17 Dec. 1881. He was graduated in medicine at the University of Pennsylvania in 1832, and began his arctic experiences as surgeon in the second Grinnell expedition sent out under Captain Kane in 1853, in search of Franklin. Becoming convinced of the existence of an open polar sea, he was enabled to obtain funds for the expedition on which he sailed in the ship *United States* from Boston in 1860. He had two astronomers on board and according to their observations reached lat. 81° 35' N., lon. 70° 30' W., the farthest point north hitherto recorded in any voyage. In 1869 he made a voyage to Greenland. He received gold medals from the geographical societies of Paris and London. His published works comprise 'An Arctic Boat Journey' (1860); 'The Open Polar Sea' (1867); 'Cast Away in the Cold' (1868); and 'The Land of Desolation' (1872).

Hayes, Rutherford Birchard, 19th President of the United States: b. Delaware, Ohio, 4 Oct. 1822; d. Fremont, Ohio, 17 Jan. 1893. His early education was obtained in the common schools of Fremont and the academy at Norwalk, Ohio. At 16 he entered Kenyon College, from which he was graduated in 1842 as the valedictorian of his class. In 1843, he entered the law school of Harvard University and completed the course in 1845. He was admitted to the bar at Marietta, Ohio, and opened an office at Fremont; but, his health failing, he was compelled to go South, establishing himself later at Cincinnati (1849). His ability and industry soon gained recognition and secured him an excellent practice. He was city solicitor of Cincinnati from 1858 until April 1861, an office which brought him prominently before the people.

Hayes' military career began at the outbreak of the Civil War, when he was elected captain of a company formed from the old Literary Club of Cincinnati. A few months later, June 1861, he was appointed major in the 23d Ohio Volunteer Infantry, of which W. S. Rosecrans was colonel and Stanley Mathews, lieutenant-colonel. After the promotion and transfer of these two officers, the regiment was put under his command, and ordered at once to West Virginia; it took part in all of the important battles of Sheridan's campaign. In the battle of South Mountain he was severely wounded in the arm but soon recovered and returned to duty again. At the battle of Winchester, he made the famous charge across the swamp and saved the day. Many fell in that charge, but the day was won. He was no less courageous at Fisher's Hill and Cedar Creek. For meritorious service he was promoted to the rank of brigadier-general of volunteers and later brevetted major-general. He was nominated for Congress in his home district at Cincinnati, and in the fall of 1864, elected by a majority of 2,400; in 1866 he was re-elected. In 1867 he was nominated for governor of Ohio, by the Republicans; at that time a strong reaction against many of the policies of this party was felt in several States of the North, and the party itself in Ohio was divided into two factions. Hayes was one of the few men who could unite these factions, and he was

elected by a small majority; and again chosen governor in 1869. At the close of his second term, he returned to Cincinnati determined to retire from public life; and in 1873 he moved to his old home at Fremont. In 1875, however, he was nominated for governor, and was with difficulty induced to accept the nomination. The great issue of the campaign was the money question, which though properly a national issue had been forced into State politics. There were those who believed and publicly contended that all that was needed to make money was the stamp of the government of the United States, that it was not necessary to have back of it any intrinsic value. Hayes, however, stood for "sound money," and after an active campaign won the election, thus becoming governor of Ohio for a third time.

When the National Republican Convention met at Cincinnati in 1876, a number of prominent leaders were candidates for the presidency. It soon became evident that none of the recognized candidates could be nominated and a "dark horse" was looked for. Thus it happened that Governor Hayes was nominated on the seventh ballot. The campaign which followed proved to be one of the most hotly contested in the history of the nation. The results were uncertain, and for the first time in our national life, a commission was created to pass upon the validity of the certificates which had been returned by the different States. This commission refused to go behind the returns of the different governors; and the votes of the Republican electors were therefore admitted from all of the doubtful States. This gave Mr. Hayes a majority of one in the electoral college, and he became the nineteenth President of the United States. (See ELECTORAL COMMISSION.) Two things were uppermost in his mind: the one, the improvement of the political condition of the South; the other, "the restoration of the civil service to the system established by Washington and followed by the early Presidents." In both of these, he was opposed by the machine politicians of his own party. In spite of this opposition, however, the troops were gradually withdrawn from the South and self-government re-established; the people were slow to see the need of civil service reform, and without effective support, the President could do little. He preserved his attitude in regard to sound money, and by his veto prevented dangerous financial legislation.

At the close of his administration, Mr. Hayes returned to private life. His interest in education was shown by the work done as a member of the boards of trustees of the Ohio Wesleyan University at Delaware and the Ohio State University at Columbus. Hayes' Hall at the latter institution bears his name because of his devotion to the cause of manual training. He was also president of the John F. Slater Educational Fund and gave much time to its proper distribution. As president of the National Prison Reform Association he did much to educate the public to a more humane way of thinking about the treatment of convicts, many of his public utterances have become maxims in prison management, and his work along these lines has been exceedingly valuable and permanent in its results.

Hayes River, called Hill River in the upper part of its course, rises near Lake Winnipeg, in Canada, and flows northeast through



RUTHERFORD BIRCHARD HAYES,
NINETEENTH PRESIDENT OF THE UNITED STATES.

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Oxford or Holy Lake, Knee Lake, and several other lakes, into James Bay, near the mouth of the Nelson River. The largest tributaries are the Shamattawa and the Fox. The length of the Hayes is about 300 miles.

Hayesine, hā'zīn, a hydrous borate of calcium, occurring as a sediment consisting of snowy-white, silky flakes, in the waters of hot springs in Chile. It is a somewhat uncertain species, and is perhaps to be referred in part to bechilite, and in part to ulexite. In the United States, specimens are reported from Bergen Hill, N. J. (Named in honor of A. A. Hayes (q.v.), an American chemist.)

Haygood, Atticus Green, American Methodist bishop: b. Watkinsonville, Ga., 19 Nov. 1839; d. Oxford, Ga., 19 Jan. 1896. He was educated at Emory College, Ga., of which he was president 1876-90, becoming in the last named year bishop of the Methodist Church South. He became bishop in 1890. He wrote: 'The Monk and the Prince,' a study of Savonarola and Lorenzo de Medici; 'Our Brother in Black' (1881); 'Pleas for Progress' (1889); etc.

Haymarket Square Massacre, the murder of several policemen in Chicago, 4 May 1886, by a bomb thrown by an anarchist. The labor troubles had long been exploited by the "practical" anarchists (with whom the philosophic anarchists disclaim connection), who denounced the efforts for shorter hours and better wages as tending merely to aggravate capitalistic slavery, and urged instead the general seizure of property and the murder of its owners. In February 1886 the McCormick Reaper Works had been closed on account of a demand for the expulsion of some non-union men, but had reopened. Meantime a great eight-hour strike had left some 50,000 unemployed workmen in the city, and in view of an almost certain conflict with the police, George Engel proposed at a meeting in Bohemian Hall on 2 May, and the meeting indorsed, a plan to blow up the police stations, shoot the emerging police, cut the telegraph wires, fire buildings to engross the service of the fire department, and make a general jail delivery, that the prisoners might aid in a social revolution. The next day August Spies and others incited a meeting of the Lumber-shovers' Union, 16,000 or more, principally Germans and Bohemians, to assail the McCormick Works in order to furnish an opportunity for carrying out this plan, though the works had no connection with this union. The mob attacked the works with stones and revolvers, but were driven off. No one was fatally injured, but Spies immediately issued a circular headed "Revenge!" asserting that six workmen had been killed, and calling their brethren to arms. He also published a fierce article in his paper, the *Arbeiter Zeitung*, repeating the falsehood, and declaring that there had been a "massacre" to terrorize the workmen, who should have had dynamite bombs instead of stones. In the evening a meeting was held at Greif's Hall, at which Engel's plan was adopted. Spies, Albert R. Parsons, Samuel Fielden, and Oscar W. Neebe spoke for a mass-meeting to further the plan above mentioned; at Adolf Fischer's suggestion it was fixed for next evening in Haymarket Square, that the dusk and the room for a great crowd might furnish more confusion and better means of escape. Rudolph Schnaubelt wished to have all socialists

in other cities notified, so that there might be a general revolution. The signal was to be "Ruhe" (Peace), which was printed in next afternoon's *Arbeiter Zeitung*. Meantime Louis Lingg and others worked all day preparing bombs, of which the newspaper office was found to be an arsenal, along with firearms, and with a confederate carried a satchel of them to a place where others helped themselves. The air was full of rumors of intended violence, and the mayor (Carter Harrison, Sr.) ordered the police to mix with the meeting, and disperse it if incendiary language were used, and 176 were concentrated at the nearest station. Spies and Parsons spoke first, but the mayor was in the crowd, and they used mild language, till his suspicions were lulled and he left. Then Fielden began a frenzied and bloodthirsty harangue, calling for the "extermination" of the capitalists. The crowd grew so wild that shortly after 10 the police in four divisions appeared and covered the street, and while Fielden was speaking, Capt. Ward ordered the crowd to disperse. Fielden called out "We are peaceable" (curiously like "Peace"), and a bomb was at once thrown into the midst of the police, which exploded and caused frightful carnage, killing or mortally wounding eight policemen and injuring a great number more. The mob instantly followed it up with a volley from rifles and revolvers, proving that they had been expecting the signal, but the police, with a nerve as fine as that of trained soldiers, at once rallied and charged the mob, dispersing it in disorder. Most of the leaders who had been urging destruction either did not attend or ran away. Of the police, besides those killed, 68 were wounded by shot or bombs, many maimed for life. Spies, Parsons, Fischer, Engel, Lingg, Fielden, Michael Schwab, and Neebe were arrested and tried as accessories before the fact: the first four were hanged 11 Nov. 1887; Lingg shattered his jaw in prison with a bomb and died; Fielden and Schwab were sentenced to prison for life, and Neebe for 15 years. The last three were pardoned by Gov. Altgeld in 1893, many prominent men of Chicago and throughout the country having petitioned for their release on the ground that the evidence did not connect them with the actual throwing of the bomb, which was true, the evidence pointing strongly to Schnaubelt.

Hayne, Isaac, American patriot: b. South Carolina 23 Sept. 1745; d. Charleston, S. C., 4 Aug. 1781. He was a wealthy planter who took up arms after the invasion of the colony by the English forces, and after the capitulation of Charleston was paroled with the proviso that he might not be ordered to bear arms against his countrymen. He was summoned, however, to the English standard and refusing compliance as a violation of the compact, hastened to the American camp. Being shortly after taken prisoner by the English, he was tried and hanged.

Hayne, Paul Hamilton, American poet: b. Charleston, S. C., 1 Jan. 1830; d. Grovetown, Ga., 6 July 1886. He was a nephew of R. Y. Hayne (q.v.) and was educated at the Charleston College, studied law and engaged in journalism. He served in the Confederate army till forced to resign on account of ill health, and lost nearly all his property through the bombardment of Charleston and the subsequent pillage. With the little left to him he retired to Copse

Hill, Grovetown, Ga., where he spent the rest of his life, a partial invalid. His verse is marked by grace and melody and he ranks almost the first among distinctively southern poets. He published 'Poems' (1855); 'Sonnets and Other Poems' (1857); 'Legends and Lyrics' (1872); etc. A complete edition of his poems appeared in 1882.

Hayne, Robert Young, American statesman: b. Colleton District, S. C., 10 Nov. 1791; d. Asheville, N. C., 24 Sept. 1839. After studying law he was admitted to the bar in 1812; and served in the second war with Great Britain, returning at its close to his practice in Charleston. He was a member of the State legislature 1814-18, and became Speaker, was attorney-general of the State in 1818-22, and a United States senator 1823-32. He vigorously opposed protection, and in 1832 boldly supported in Congress the doctrine of nullification. Daniel Webster's reply to Hayne upon this theme is classed among the former's ablest speeches. In November 1832 South Carolina adopted an ordinance of nullification, in December Hayne was elected governor, and the State prepared to resist the Federal power by force of arms. A compromise, however, was agreed to, and the ordinance was repealed. Hayne was mayor of Charleston in 1834.

Hayne, William Hamilton, American poet: b. Charleston, S. C., 11 March 1856. He is the son of Paul Hamilton Hayne (q.v.). He received a secondary education, from 1879 contributed extensively to various periodicals, and published 'Sylvan Lyrics and Other Verses' (1892).

Haynes, hānz, Arthur Edwin, American mathematician: b. Van Buren, N. Y., 23 May 1849. After graduation from Hillsdale College, Mich., in 1875 became instructor of mathematics and physics there in the same year; and was professor, 1877-90. He held the same position in Michigan Mining Schools in 1890-3, and was professor of mathematics at the University of Minnesota, 1893-6, and in its engineering department 1896-1901. He has published 'The Desirability of Uniformity in the Use of Mathematical Symbols and Terms'; etc.

Haynes, John, American colonial governor: b. Old Holt, Essex, England; d. Hartford, Conn., 1 March 1654. He came with Hooker and his company to Boston in 1633, was soon after chosen assistant, and in 1635 governor of Massachusetts. In 1636 he removed to Connecticut, being one of the prominent founders of that colony. In 1639 he was chosen its first governor, and every alternate year afterward, which was as often as the constitution permitted, till his death. He was one of the five who in 1638 drew up a written constitution for the colony, which was finished in 1639, the first ever formed in America, and which embodies the main points of all our subsequent state constitutions, and of the Federal constitution.

Hays, Isaac, American physician and editor: b. Philadelphia 5 July 1796; d. there 12 April 1879. He was graduated from the University of Pennsylvania in 1816 and from its medical school in 1820. In addition to his long service as general practitioner he was for 52 years on the staff of the 'American Journal of the Medical Service.' In 1843 he established a

monthly, the 'Medical News,' and in 1874 the 'Monthly Abstract of Medical Science.' He edited: 'Wilson's American Ornithology' (1828); 'Hoblyn's Dictionary of Medical Terms' (1846); 'Lawrence on Diseases of the Eye' (1847); and 'Arnott's Elements of Physics' (1848). He was president of the Philadelphia Academy of Natural Sciences (1865-9) and connected with many scientific societies at home and abroad.

Hays, William Jacob, American painter: b. New York 8 Aug. 1830; d. there 13 March 1875. He studied art under John Rubens Smith, and his 'Dogs in a Field,' exhibited in the Academy of Design in 1850, won him the reputation of an animal painter of remarkable fidelity to nature and spirit in design. He studied the bison in the upper waters of the Missouri and the deer in Nova Scotia. His 'Bison Bull at Bay' and 'Herd of Caribou in Nova Scotia' are characteristic pictures.

Hays, William Shakespeare, American song-writer and composer: b. Louisville, Ky., 19 July 1837; d. 23 July 1907. In 1857 he became a reporter for the Louisville *Democrat*, subsequently was clerk and captain of steamboats on the Ohio and Mississippi, and became marine editor of the Louisville *Courier Journal* and *Times*. He wrote and composed more than 300 songs, among them 'Nora O'Neil,' 'Write Me a Letter from Home,' and 'Shamus O'Brien'; and published 'Poems and Songs.' His songs sold very extensively.

Hays, Kan., city, county-seat of Ellis County; on Big Creek, and on the Union P. railroad; about 222 miles west of Topeka. It is in a fertile agricultural region. The chief manufactures are flour, dairy products, and machinery. It has grain-elevators, and there are large annual shipments of grain, flour, and live stock. It is the seat of a Normal school and of a State agricultural experiment station. The experiment station is connected with the State Agricultural College, which owns near Hays 2,000 acres of land. Pop. (1910) 1,961.

Hayti. See HAITI.

Hayward (properly "haw-ward," keeper of the haws or hedges, and still so pronounced, or rather as "howard," in country districts; the family name Howard as well as Hayward is from this), a town officer in old New England, whose duty was to keep the cattle on the roads from breaking through the hedges or fences into enclosed grounds and to impound them if they did so. The title came to be generic for a cattle-ward, and the hog-reeve was frequently known as a "hog howard."

Hayward, Wis., town, county-seat of Sawyer County; on the Namakagon River, and on the Chicago, St. P., M. & O. railroad; about 63 miles by rail southwest of Ashland. It is in the vicinity of the lumber region of the State, and the chief industry is lumbering. It has a government Indian school, a public library, and four churches. Pop. (1910) 2,869.

Hazard, hāz'ard, Caroline, American college president: b. Peacedale, R. I., 10 June 1856. She was educated in Providence and in Europe, and in 1899 was appointed president of Wellesley College, Mass., receiving the degrees of M. A. and Litt. D. from the University of Michigan and Brown University the same year. She is a

granddaughter of R. G. Hazard (q.v.) and has published 'The Narragansett Friends' Meeting in the 18th Century' (1899); 'Thomas Hazard: a Study of Life in Narragansett in the 18th Century.'

Hazard, Ebenezer, American author: b. Philadelphia 15 Jan. 1744; d. there 13 June 1817. He was graduated from Princeton in 1762, in 1782-9 was postmaster-general, and from 1791 was in business in Philadelphia, where he assisted in the establishment of the North American Insurance Company. He published 'Historical Collections' (1792-4) and 'Remarks on a Report Concerning Western Indians.'

Hazard, Rowland Gibson, American manufacturer and philosopher: b. South Kingston, R. I., 9 Oct. 1801; d. Peacedale, R. I., 24 June 1888. He was a successful business man, being long engaged in the woolen manufacture in Peacedale. He also wrote on philosophical subjects; his works including 'Language, its Connection with the Constitution and Prospects of Man' (1836); 'Essays on the Resources of the United States' (1864); 'Causation and Freedom of Willing' (1869).

Haze, a condition of the atmosphere which deadens the blueness of the sky, and obscures the sharp outlines of distant objects. Haze is due to fine dust in the air or to extreme heat, the latter being known as heat-haze. In certain parts of China the haze is like a thin fog. Extensive forest fires create a smoke-haze, of a dense, blue color, which drifts like rain clouds hundreds of miles from the scene of the fire. Volcanic eruptions throw fine dust into the air in enormous quantities, forming a haze which is carried many hundreds of miles. See DUST.

Hazel-nut, or **Filbert**, a genus (*Corylus*) of shrubs and trees of the order *Cupulifera*, confined to the northern hemisphere. The male flowers are in long cylindrical aments or catkins; and the fruit, a nut, is marked at its base with a large cicatrix. The inflorescences of the hazel are developed in the year preceding their appearance; the male flowers last over the winter, naked; the female inflorescence is enclosed in a bud. In early spring the male catkins elongate and produce an abundance of dry pollen, while the female inflorescences are distinguishable from the leafbuds only by their larger size and projecting red stigmas. The nut is enveloped at the base by a sheath of succulent bracts.

The European hazel (*C. avellana*), from cultivation, has produced several varieties, differing in the size, shape, and flavor of the nuts, which are commonly known under the name of filberts. It grows in all situations, and is easily cultivated, but a light and tolerably dry soil is the most suitable. The best nuts come from Spain, where they are baked in large ovens before export, in order to ensure their preservation. Other species occur in southern Europe and Asia. The American hazel (*C. americana*) very much resembles the European, but is lower in stature. It is common in most parts of the eastern United States, but has not been cultivated. A second species (*C. rostrata*) occurs in California.

The oil which is obtained from hazel-nuts by pressure is little inferior in flavor to that of almonds, and chemists employ it as the basis of fragrant oils artificially prepared and used by

perfumers, because it easily combines with and retains odors. In many parts of England hazels are planted in coppices and hedge-rows for several useful purposes, but particularly to be cut down periodically for charcoal, poles, fishing-rods, etc. In brewing, the dried twigs were used as a substitute for yeast when they were soaked in fermenting liquor. Being extremely tough and flexible, the branches are used for making hurdles, crates, and springles to fasten down thatch. They are formed into spars, handles for implements of husbandry, and when split are bent into hoops for casks. Charcoal made from hazel is much in request for forges, and when prepared in a particular manner is used by painters and engravers to draw their outlines. The roots are used by cabinet-makers for veneering; and in Italy the chips of hazel are sometimes put into turbid wine for the purpose of fining it. Finally forked twigs of the European hazel were formerly used by diviners to determine the position of water, gold, etc.

Hazeltine, hā'zēl-tīn, **Mayo Williamson**, American journalist and literary critic: b. Boston, Mass., 24 April 1841. He graduated from Harvard, studied also at Oxford, practised law until 1878, and was then appointed literary editor of the New York *Sun*. He became widely known as a critic for his reviews in the *Sun*, and has published in book-form: 'Chats about Books' (1883); 'British and American Education'; 'The American Woman in Europe.'

Ha'zen, **Marshman Williams**, American lawyer and author: b. Beverly, Mass., 1845. He was graduated from Dartmouth in 1866, from 1873 was a manager for the publishing firms successively of Ginn & Company and D. Appleton & Company, in 1882 was admitted to the Massachusetts bar, and in 1885 began the practice of law in New York. His publications include, besides a series of 21 school text-books: 'Observation, Thought, and Expression'; a 'History of the United States'; and 'Government.'

Hazen, **William Babcock**, American soldier: b. West Hartford, Vt., 27 Sept. 1830; d. Washington, D. C., 16 Jan. 1887. He was graduated at West Point in 1855, went to the front in the Civil War in command of 41st regiment of Ohio volunteers, which he himself had recruited in 1861, served actively in Ohio, Kentucky, and through the Atlanta campaign and in Sherman's march through Georgia, and in 1865, took command of the Fifteenth army corps. He observed the Franco-Prussian war on French territory, and was at Vienna as military attaché to the United States legation during the Turko-Russian war. Appointed chief signal officer in 1880, with the rank of brigadier general, he employed scientists as observers, introduced "cold wave" signals, and suggested the standard-time meridians at present in use. He published: 'The School and the Army in Germany and France, with a Diary of Siege Life at Versailles' (1872); 'Our Barren Lands' (1875); and 'A Narrative of Military Service' (1885).

Ha'zleton, Pa., a city situated in Luzerne County; on the Pennsylvania and the Lehigh Valley R.R.'s; about 24 miles south of Wilkes-Barre. The city was settled in 1820, incorporated as a borough in 1840, and chartered

as a city in 1890. It is situated in the anthracite coal region, and its industrial interests are largely connected with the mining and shipping of coal. Its chief manufactures are foundry and machine-shop products, carriages, lumber, beer, baking-pans, cattle-powder, cigars, coffins and caskets. It has knitting mills, silk mills, three daily and eight weekly newspapers. It contains a State hospital for miners, 30 churches, three banks, a convent, high school, and Saint Gabriel's Academy. The government is vested in the mayor, who holds office three years, and in the council. The subordinate officials are appointed by the mayor, subject to the approval of the council. Some are elected by the council. Pop. (1910) 25,452.

Hazlitt, hăz'lit, **William**, English critic and essayist: b. Maidstone, Kent, 10 April 1778; d. Westminster 18 Sept. 1830. In 1793 he became a student in the Unitarian College at Hackney. He devoted more time, however, to literature and art than to theology, and upon leaving college resolved to become a painter. He painted portraits with only tolerable success, and finally renounced art, and in 1805 opened his literary career with an essay 'On the Principles of Human Action,' in which much metaphysical acumen was displayed. In 1811 he settled in London, deriving his principal support from his contributions of political articles and theatrical and art criticisms to the newspapers, and his occasional lectures and publications. In 1813 he delivered at the Russell Institution a course of lectures on 'English Philosophy,' and subsequently delivered courses of lectures on the English poets generally, the comic poets, and the Elizabethan poets. Later in life he contributed to the 'Edinburgh Review' and some smaller magazines. He was a good art critic, but his tendency to prejudice and paradox, and his almost contemptuous regard for the productions of contemporary genius, render him a less safe authority than his knowledge and talents would lead us to expect. It is as a literary critic and essayist that Hazlitt achieved his chief success. Saintsbury has said that 'long before Sainte-Beuve, Hazlitt had shown a genius for real criticism.' He has probably not been surpassed by any English critic. Yet his recognition, in view of this fact, has been singularly inadequate to his merits. His judgment was, it is true, often marred by prejudice and by his paradoxes. But in the main it was discriminating and duly appreciative. His equipment might not now be thought adequate, but it was almost certainly in most respects superior to that of his Georgian contemporaries. He was able to write interestingly of a wide range of topics. He was bitterly attacked, after the custom of the times, by writers, particularly journalists, of adverse political views. But as a controversialist he was more than the equal of any of these, bold in epigram and invective. His style has been highly praised for its combination of vigor and ease, its rhythm, its clearness, and the aptness of its epithets. Not only in critical analysis, but as well in narrative and description it is excellent. Hazlitt also lectured in 1818-21 at the Surrey Institute. Northcote states that had he continued his art work he would have become a great painter. The best of his essays for the 'Examiner' appeared in 1817 under the title 'The

Round Table.' The 'Spirit of the Age, or Contemporary Portraits,' also a significant work and by some critics considered his best, was published in 1825. Further essays are grouped in 'The Plain Dealer' and 'Sketches and Essays.' Among other well-known works of Hazlitt are: 'Characters of Shakspeare's Plays' (1817); 'A View of the English Stage' (1818); 'Lectures on the English Poets' (1818); 'Lectures on the English Comic Writers' (1819); 'Lectures on the Elizabethan Age' (1821); 'Life of Napoleon Bonaparte' (4 vols. 1828). There is an edition of the 'Works' by Henley (1902); and a 'Life' by Berrell (1902).

Hazlitt, William Carew, English author: b. London 22 Aug. 1834. He is a grandson of William Hazlitt (q.v.). He was at first a civil engineer, relinquished that profession for journalism, and finally took up that of literature. Among his works are: 'History of the Venetian Republic' (1860); 'Bibliographical Collections and Notes' (1876-92); 'Memoirs of William Hazlitt' (1897); 'Four Generations of a Literary Family' (1897); 'Leisure Intervals,' poems (1897); 'Ourselves in Relation to a Deity and a Church' (1897); 'Coins of Europe' (1893-7).

Hazor, or **Chazor** (Heb., enclosure), the name of several places in ancient Palestine, the best known of which was the seat of Jabin, a Canaanitish king of considerable power, who, with his allies, was defeated by Joshua (Josh. xi. 1-13). Though it recovered and oppressed Israel, it was conquered a second time by Barak (Judges iv.) and remained in the possession of Israel until the invasion of Tiglath-pileser. Solomon made it a northern frontier fortress (1 Kings ix. 15). Its site has been variously placed, by many at Tell Hara, 2½ miles southeast of Kadesh. Consult the 'Journal of Sacred Literature' for 1866, p. 245.

Hazzard, **David**, American politician and jurist: b. Broadkiln Neck, Sussex County, Del., 18 May 1781; d. 8 July 1864. He served as an ensign in the War of 1812, was elected governor on the American Republican ticket in 1829, and subsequently was State senator and an associate judge. During his administration as governor, a constitutional convention was held at Dover, Del., by which among various revisions, the governor's term was changed from three to four years. Hazzard was a member of the constitutional convention of 1852.

Head, Barclay Vincent, English numismatic scholar: b. Ipswich, Suffolk, 2 Jan. 1844. In 1864 he became an assistant in the British Museum, where in 1893 he was made keeper of the department of coins and medals. He was also appointed joint-editor of the 'Numismatic Chronicle.' His chief work is the 'Historia Nummorum' (1887), a valuable study, and the standard one in its department. Among further publications by him are: 'History of the Coinage of Boeotia' (1881), and 'Guide to the Coins of the Ancients' (1881).

Head, Sir Edmund Walker, English colonial administrator and author: b. near Maidstone, Kent, 1805; d. London 28 Jan. 1868. He was educated at Oriel College, Oxford, became a fellow of Merton, studied law, was a poor-law commissioner in 1841, and in 1847-54 lieutenant-governor of New Brunswick. From 1854 to his

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retirement in 1861 he was governor-general of Canada. During his administration Ottawa was chosen as the capital of Canada, the Victoria bridge at Montreal was constructed, and the seigniorial tenures (see CANADA — SEIGNIORIAL TENURE) and the clergy reserves (see CANADA — THE CLERGY RESERVES) were abolished. In 1863 he was appointed a civil-service commissioner and in 1867 a privy councillor. He was an art critic of some importance, and published a 'Handbook of Painting of the German, Dutch, Spanish, and French Schools' (1848), and other works. His poetical contributions to 'Fraser's Magazine' appeared in 1868 in book-form.

Head, Sir Francis Bond, English colonial administrator and author: b. near Rochester, Kent, 1 Jan. 1793; d. Croydon, Surrey, 20 July 1875. Educated at Woolwich, he became first lieutenant of engineers in 1811, was at Waterloo and at Fleurus, retired from the army in 1825, and went to South America as a prospector in gold and silver mines. Of some of his experiences there he gave an account in 'Rough Notes of a Journey in the Pampas and Andes' (1828). In 1835 he was appointed lieutenant-governor of Upper Canada. His administration was a decidedly unfortunate one. Unfamiliar with the political status of the country, he opposed the union of the provinces, and endeavored to conduct the government without the assistance of a council. This state of affairs may be regarded as the chief cause for the part taken by Upper Canada in the insurrection of 1837. His numerous publications include: 'Bubbles from the Brunnen of Nassau' (1833); 'The Defenceless State of Great Britain' (1850); 'The Horse and His Rider' (1860); 'The Royal Engineer' (1869).

Head, Sir George, English writer of travels, etc.: b. Higham Parish, Kent, 1782; d. 1855. He held various posts in the army, and was present at most of the great battles of the Peninsular. In 1814 he proceeded to Canada to be chief of the commissariat of a proposed navy on the Canadian lakes, and subsequently published his experiences in 'Memoirs of an Assistant Commissary-General' and 'Forest Scenes and Incidents in the Wilds of North America.' He was knighted in 1831 by William IV. He also wrote 'Rome, a Tour of Many Days'; 'A Home Tour Through the Manufacturing Districts of England,' and 'A Tour Through Various Parts of the United Kingdom' and other works.

Head, Natt, American politician: b. Hooksett, N. H., 20 May 1828; d. there 12 Nov. 1883. He became a railroad and general building contractor, sat in the State legislatures of 1861 and 1862, was adjutant-general of the State in 1864-70, and in that capacity published a four-volume military record of New Hampshire during the Civil War. In 1876 and 1877 he was elected to the State senate and in the latter year was its president. He was governor in 1879-80.

Head, the anterior part of the body of an animal when it is marked off by a difference in size, or by a constriction. The presence or absence of a head was formerly much used as a character in classification. But this line of classification is artificial. The mouth and principal nervous organs are the guides to the anterior end of the body, where the head, when recognizable, is situated. In the protozoa, infusoria, and coelenterates, such as the hydra and

corals, there is no nervous ganglion, and the mouth is not surrounded by special structures. In the inferior vermes the anterior end becomes marked by the presence of ganglia. The so-called head of parasitic animals, such as the tapeworms, is only the end of attachment, but neither mouth nor ganglia exist in it. In the polyzoa, lampshells, ascidians, and lamellibranch mollusks mouth and ganglia exist, but they are not surrounded by special structures. But in the worms proper, the articulated animals, the land and fresh-water gasteropods and the cuttlefishes a head proper is found. That is, the mouth and the anterior nervous ganglia are placed in a segment of the body which, by structure, is different from the rest. Thus in the worms and articulated animals some of the rings or articles of which the body is made up are fused together, the appendages being not walking limbs, but modified into jaws or jaw-like organs. Thus the common shoreworms possess a structural head, though it is not apparent. The head is best defined in the insects. The snail's head has its cavity shut off by a diaphragm from the rest of the body cavity. The cuttlefishes have, in addition, a remarkable cartilaginous box, which, like a skull, protects the ganglia and gives support to the muscles. The head of the vertebrated animals presents a regular series of increasing complexity from the amphioxus upward. In that fish the most anterior part of the nervous cord is lodged in a canal scarcely distinct from that which contains the rest of it. Ascending in the series, it becomes evident that as the anterior nervous mass enlarges, and its ganglia increase in complexity, the anterior vertebræ change their character; as the brain becomes specialized, so does the brain-case or skull. In man the brain attains its highest development and the head its greatest complexity, the difference between skull and face being now most pronounced. The vertebrate theory of the skull, first propounded by Goethe, is now accepted to this extent, that the skull or cranium consists of three vertebræ, which are recognizable in the fish, and that the facial bones are not vertebræ, but developed from cartilage which did not form an original part of the vertebral column. A vertebra consists of a body or centre, from which two processes arch upward and close in the spinal canal with its contents, the spinal cord. The posterior cranial vertebra is the occipital, consisting of a centre, two lateral pieces, and a superior, the next is the parietal, of which the basisphenoid is the centre, and the great wings of the sphenoid and the parietals the lateral arches; the most anterior is the frontal, with its centre, the presphenoid, and its arch, formed by the orbital plates of the sphenoid and the frontals. The centres of the spinal vertebræ are ossifications around a fibrocartilaginous rod, the *chorda dorsalis*, which ends in the basisphenoid. So far spinal column and skull have a common base; but the spinal vertebræ were preceded by and are in fact modifications of primitive vertebræ, and no representatives of these appear in the development of the skull. It is therefore open to question whether the three divisions just mentioned are really vertebræ, or should not rather be called cranial segments. There is the more reason for this that in fishes the basisphenoid and pre-

HEAD-HUNTING — HEADACHE

sphenoid are represented by a single bone, the parasphenoid, which underlies the skull, but disappears in the higher vertebrates, and that the presphenoid is not properly connected with the chorda dorsalis, but rather belongs to the series of facial bones. The pituitary body which projects from the lower surface of the brain lies in front of the end of the chorda dorsalis: from this latter rod and its surroundings a plate of cartilage passes forward on either side of the pituitary body, and these (the *trabeculae*) meeting in front of that body, form the cartilaginous axis around which the vomer, ethmoid, and other facial bones are developed, while the presphenoid is an ossification in this axis just where the two portions meet in front of the pituitary. The sense organs, the ear and the eye, are, so to speak, lodged in capsules of bone which are inserted, the ear between the occipital and parietal, the eye between the parietal and frontal segments. They are accidental, not essential parts of the cranium. The hyoid apparatus and the lower and upper jaws are developed from the cartilaginous walls of the embryonic skull, and the jaws come in a secondary manner to take part in the composition of the face. (See RESPIRATORY ORGANS.) The increasingly globular form of skull in the vertebrates is due to the greater increase of the cerebral hemispheres relatively to that of the base of the brain and axis of the skull; hence the brain comes in man to overhang the face. Of course it is to be remembered that while in the vertebrate animals the head is divided by its axis (commencing at the middle line of the upper jaw, and passing backward through the basisphenoid to the vertebral centres) into an upper chamber, lodging the brain, and a lower, lodging the first part of the alimentary canal; in the lower animals the cavity is a single one, the oesophagus piercing the nervous system so as to reach the surface of the body, and thus coming to be surrounded by a pair of ganglia above and a pair below, with the filaments connecting these ganglia. In the vertebrate the head is curved downward, the basisphenoid being the pivot point, so that the mouth is pushed to the lower surface; in the lower animals the under surface of the body curves upward, so as to carry a part of the nervous system past the mouth toward the upper surface. The eyes and feelers of a crab are in fact modified limbs which are thus carried upward; the jaws and sense organs of a vertebrate are entirely distinct from the limbs and other appendages of the trunk.

grants arriving at New York, the funds going to the support of the State board of immigration. A test of the legality of the tax being made in the courts, a decision was rendered that the New York statute was void because it infringed on the prerogatives of national government. Subsequently the act of Congress imposing the tax was questioned in the United States Supreme Court, and a decision affirming the constitutionality of the law was made. The national act provides that the tax shall be paid by the master or owner of the vessel bringing the immigrants, to the collector of the port, and by him turned over to the treasury of the United States, to be used by the secretary to defray the expenses of regulating immigration and to relieve immigrants in distress. See IMMIGRATION.

Headache, pain in the head, the result of a variety of causes. It may arise from overfulness of blood, from deficiency of blood or debility, from excited or inflammatory action, from the nerves, etc. If a person who suffers from headache is of full habit generally; if he is sleepy, dull, the vessels of his face full; overfulness is the probable cause, and reduction of the diet, with occasional doses of saline medicine, exercise, bathing the head with cold water, will be beneficial. If the urine is deficient, cream of tartar in some form may be taken with advantage. The above species of headache may also be occasioned by whatever impedes the circulation, such as affection of the heart or liver; when the latter is the case, the pain is frequently most severe at the back of the head. When, on the other hand, headache occurs in a person of weak constitution; when it is produced or aggravated by mental over-exertion; when there is listlessness both of mind and body rather than oppression—the face pale, the pulse weak—debility is the probable cause. This form of headache is often accompanied with indigestion, and is common in students and anxious men of business. Anything like abstraction of blood will certainly prove injurious. Exercise, attention to the state of the bowels, care in diet, rest, and change of scene and air, will be most useful. Headache from excitement or inflammatory causes is such as occurs in the first stages of inflammation of the brain and in some forms of fevers, or it follows violence to the head. Of all kinds of headache that arising from some disorder of the stomach is, however, the most common. The presence of indigestible food in the stomach almost certainly causes dull pain in

DIAGRAM, ILLUSTRATING GOETHE'S THEORY OF THE VERTEBRATE HEAD.

NASAL.		FRONTAL.		PARIETAL.		OCCIPITAL.	
Nose.		Frontals.	EYE.	Parietals.	EAR.	Supraoccipital.	} Arches.
Ethmoid and Prefrontal.		Orbitosphenoids.	Pituitary.	Orbitosphenoids.		Exoccipitals.	
Vomer.		Presphenoid.		Basisphenoid.		Basioccipital.	} Centra.
Upper jaw.				Parasphenoid.			
Mouth.							
Lower jaw.							
			Suspensorium.		Hyoid		

Head-hunting. See DYAKS.

Head Money, an immigration tax of 50 cents levied by act of Congress 3 Aug. 1882 on every foreigner brought to the United States. Before the passage of this act the State of New York levied a "head tax" on all immi-

the forehead; and too acid a condition of the contents of the organ produces the same effect. The various symptoms of indigestion will generally point to the cause. In the first some aperient, such as a saline draught, will probably remove the disorder. When acid eructa-

tions, heartburn, etc., indicate the presence of superabundant acid, a dose of soda, potash, or magnesia will correct the cause. There is a form of headache which consists in throbbing and pain of one part, or sometimes over one side of the head. This is called hemicrania (the migraine of French and the megrim of old English writers), and is often of a distinctly intermittent character. For its permanent cure quinine is in common use; a mustard poultice on the nape of the neck is also of service; and antipyrin has proved of value in affording relief. It should be well understood that the habitual use in headache of strong and swiftly working drugs is likely to undermine the nervous system, and increase liability to attack. Exercise, moderation and cheerfulness are the best preventives.

Headley, héd'li, Joel Tyler, American historian: b. Walton, N. Y., 30 Dec. 1813; d. Newburg, N. Y., 16 Jan. 1897. Graduated from Union College in 1846, he took a course in theology at the Auburn Seminary, was pastor at Stockbridge, Mass., and in 1846 became assistant editor of the New York *Tribune*. In 1856-7 he was secretary of state for New York. His works, written in a popular vein, had great currency in their day, and include: 'Napoleon and his Marshals' (1846); 'Washington and his Generals' (1847); 'The Adirondacks' (1849), said to be the first book to advocate that region as a health-resort; 'Grant and Sherman, their Campaigns and Generals' (1865); and 'The Great Rebellion' (1864).

Headley, Phineas Camp, American Congregational clergyman: b. Walton, N. Y., 24 June 1819; d. Lexington, Mass., 1903. He was a brother of J. T. Headley, the historian (q.v.). He was admitted to practice at the bar in 1847, but studied theology at Auburn Seminary, held pastorates in various Presbyterian and Congregational churches, and contributed to the New York 'Observer' and *Tribune*, and many other newspapers and magazines. Among his works are: 'Women of the Bible' (1850); biographies of the Empress Josephine (1851), Kosuth (1852), Lafayette (1853), Mary, Queen of Scots (1856), Ericsson (1863), Farragut (1864), and others; 'Half-Hours in Bible Lands' (1867); 'Court and Camp of David' (1868); and 'Public Men of To-day' (1882).

Healy, George Peter Alexander, American painter: b. Boston 15 July 1808; d. Chicago 24 June 1894. He went to Paris about 1836, where he remained several years, alternating his residence there with occasional visits to the United States. Among works executed by him abroad are portraits of Louis Philippe, Marshal Soult, and Gen. Cass. At home he painted Calhoun, Webster, Pierce, and other prominent American statesmen. He occasionally produced large historical pictures, of which 'Webster's Reply to Hayne,' illustrating a well known scene in American legislative history, completed in 1851, now hangs in Faneuil Hall in Boston. At the exhibition of Paris in 1855 he exhibited a series of 13 portraits and a large picture representing Franklin urging the claims of the American colonies before Louis XVI., for which he received a medal of the 2d class. Portraits by him of Buchanan and Lincoln are in the Corcoran Gallery at Washington.

Healy, Timothy Michael, Irish political leader: b. Bantry, County Cork, Ireland, 17 May 1855. He was elected to Parliament for Wexford in 1880, County Monaghan in 1883, South Londonderry in 1885, North Longford in 1887, and County Louth, North, in 1895. In 1884 he was called to the Irish bar. He became known as a leader of the Irish Nationalist party, was a founder of the Dublin 'National Press' (later combined with the 'Freeman's Journal'), and was repeatedly in difficulties because of his public utterances on political matters. He made a lecture tour of the United States with Dillon and Parnell in 1880, and in 1881 participated in the Land League convention at Chicago, when \$250,000 were contributed to the Irish cause. The 'Healy Clause' of the Land Act of 1881, providing that no tenant should pay rent on improvements made by him, was introduced by him. He wrote 'A Word for Ireland' (1886).

Heap, David Porter, American engineer: b. San Stefano, Turkey, 24 March 1843; d. 25 Oct. 1910. He studied at Georgetown College, was graduated from the U. S. Military Academy in 1864, served in the Civil War with the engineer corps of the Army of the Potomac, and was brevetted captain for his services. In 1895 he attained the grade of lieutenant-colonel of engineers. He was for years employed in the construction of fortifications and the improvement of harbors, and in 1881 was military representative of the United States at the Paris congress of electricians. In addition to a 'Report on the International Exhibition of Electricity at Paris' (1884), he published: 'Ancient and Modern Light-Houses' (1889); 'Electrical Appliances of the Present Day'; 'Engineer Exhibit, Centennial Exhibition' (1882); and 'History of the Application of Electricity to Lighting the Coasts of France' (1885).

Heard, Franklin Fiske, American jurist: b. Wayland, Mass., 17 Jan. 1825. He was graduated at Harvard in 1848; was admitted to the bar in 1850; and practised in Middlesex County and later in Boston. He attained a reputation as an authority on pleading, and in 1861-6 was an editor of the 'Monthly Law Reporter.' His publications include: 'Libel and Slander' (1860); an edition of 'Stephen on Pleading' (1867); standard books on 'Criminal Pleading' (1879) and 'Civil Pleading' (1880); 'Heard on Criminal Law' (2d. ed 1882); 'Shakespeare as a Lawyer' (1883); 'Precedents of Equity Pleadings' (1884); 'Precedents of Pleadings in Personal Actions in the Superior Courts of Common Law' (1886).

Hearing, one of the five senses, the physical organ of which is the ear. (See EAR, ACOUSTICS.)

Hearn, hêrn, David William, American Roman Catholic clergyman and educator: b. Boston, Mass., 21 Nov. 1861. He was graduated at Boston College in 1880; took post-graduate courses in literature, science and philosophy for five years, and theological courses for four; entered the Society of Jesus, and was ordained priest of the Roman Catholic Church. He was successively professor in Georgetown University, vice-president of Boston College, and vice-president of the College of Saint Francis Xavier, New York. In 1900 he became president of Saint Francis Xavier.

Hearn, Lafcadio, American author: b. Santa Maura (Leucadia), Ionian Islands, 27 June 1850; d. Tokio, Japan, 26 September 1904. Educated in England and France, he came to the United States in 1869, was a journalist in Cincinnati and New Orleans, in 1887-9 was at Saint Pierre, Martinique, French West Indies, and in 1890 went to Japan. He became a Japanese subject with the name Yakumo Koizumi, and was appointed lecturer in English literature at the Imperial University of Tokio. His 'Stray Leaves from Strange Literature' (1884), and 'Some Chinese Ghosts' (1887), were succeeded by 'Chita: A Memory of Lost Island' (1889), story of the destruction of 'L'île Dernière,' once the watering-place of Louisiana fashion, which attracted attention by its descriptive powers; and 'Two Years in the French West Indies' (1890), which gained new interest through the Martinique disaster of 1902. Among his further works, dealing almost exclusively with things Japanese and revealing a thorough comprehension of and sympathy with the art, myth, tradition, and philosophy of the Orient, are: 'Out of the East' (1894); 'Glimpses of Unfamiliar Japan' (1895); 'Kokovo' (1896); 'Gleanings in Buddha-Fields' (1897); 'Exotics and Retrospections' (1898); and 'Kottō, or Japanese Curios' (1902).

Hearst, Phoebe Apperson, American philanthropist: b. 1840. She was for a time a teacher, and in 1861 married George F. Hearst of California. She has been active in charitable and philanthropic enterprises and has given largely, especially to educational institutions. In San Francisco she has established kindergarten classes for the children of the poor, and a manual training school, and has organized a number of working girl's clubs. She has also given money to build a National Cathedral School for girls; has made donations to the American University at Washington; has established and given largely to public libraries in the mining towns of the West; and maintained a school for mining engineers at the University of California. In 1896 she offered to pay the expenses of an international competition of architects to obtain a suitable plan for a campus and buildings for the University of California, and to erect two buildings in accordance with this plan. See CALIFORNIA, UNIVERSITY OF.

Hearst, William Randolph, American newspaper publisher: b. San Francisco. He was graduated from Harvard, and on leaving college took charge of the publishing of the San Francisco *Examiner*, formerly owned by his father, Senator Hearst of California. In 1895 he bought the New York *Journal*, the name of the morning edition of which he later changed to the *American*; in 1900 he started the Chicago *American*; in 1904 the Boston *American* and the Los Angeles *Examiner*. In 1902 he presented the Greek Theatre to the University of California. He represented the 11th Congressional District (New York) in the 58th and 59th Congresses. In 1905 he was defeated for the office of Mayor of New York City and in 1906 for Governor.

Heart, The. The heart and the blood-vessels constitute the mechanical means for maintaining the circulation of the blood. In many respects this system is the most readily understood of any in the body, in that it is

largely mechanical. There are, however, certain factors not existing in an ordinary system of hydraulics which, while essential to the proper performance of the function in the human body, render the understanding of the subject more difficult. The heart is merely a pump, or rather two pumps fused, for convenience, into one. It derives its power through contraction of the red muscle which forms its wall. It is hollow, alternately filling and emptying, receiving blood from one set of tubes filling its cavities, then emptying its contents into other tubes by contraction of its walls and momentary obliteration of its cavities. The action is analogous to that of the ordinary bulb syringe. The proper direction of the flow of the blood is maintained by valves, similar in structure and like in function to the valves in an ordinary pump.

The heart is about the size of the closed fist. The average dimensions of the adult organ are: length 85-90 millimetres in the male, 80-85 mm. in the female; breadth, 92-105 mm. in the male, 85-92 mm. in the female; thickness, 35-36 mm. in the male, 30-35 mm. in the female. The average weight in men is 300 grams; in women 250 grams. The heart is cone-shaped with the base uppermost. It lies within the cavity of the bony chest, a small portion of its anterior surface being in contact with the chest-wall, the rest covered by the overlapping lungs. The apex of the cone, or "apex," as it is technically called, is in the space between the fifth and sixth ribs on the left side, about 2 centimetres to the inside of a vertical line drawn through the left nipple. The heart reaches no lower and no farther to the left than this. From this point it reaches upward to the second rib, two thirds of its mass being to the left of the middle line of the body, one third to the right. Its long axis is neither vertical nor horizontal but is inclined to an angle of about 30 degrees to the horizontal, hence 60 degrees to the vertical. Therefore it is nearer horizontal than vertical. The position of the apex of the heart can be readily determined by placing the finger in the interspace mentioned and feeling the beat. In the healthy individual when not under excitement of the emotions or exercise no motion of the heart can be felt by the finger upon the chest-wall except at the apex.

Of secondary importance only to the heart is the system of tubes conveying the blood: arteries, capillaries, veins. The arteries are thick-walled, elastic tubes, dividing and subdividing into smaller tubes, but the total sectional area increases as the vessels become smaller in diameter. These end in a fine network of very small, thin-walled tubes called from their resemblance in size to hairs, capillaries. These in turn become veins, enlarging their diameter and diminishing their number, thus reversing the process in the arteries. Veins have very thin walls in proportion to the diameter of the bore and are provided with valves to prevent a back flow of blood.

This arrangement of the blood-vessels may be likened to two cones, base to base, one apex representing the largest artery leaving the heart, the other apex the largest vein entering the heart, and the bases of the cones the wide capillary system. The flow of blood will be naturally fastest in the larger arteries and veins, slower in the smaller arteries and veins, and slowest in the capillaries, due to the fact already men-

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tioned that as vessels divide although the branches are smaller in diameter the combined sectional area is larger. The condition is quite like that of the flow of water in a river, the current being swiftest where the banks approach each other, slowest where the river widens into a lake or pond, again to become swifter as the width of the stream lessens.

The two pumps which compose the heart as a single whole are called the right heart and left heart. This designation takes its origin from the fact that one is more to the right side of the body, the other to the left side. Ordinarily the two parts are spoken of as the right side and the left side. The left side is by far the more powerful pump, having a very thick wall, its function being to force the blood under considerable pressure through most of the body, the so-called systemic circulation. The right heart has merely to force the blood through the lungs, a relatively short distance and under low pressure.

Each half of the heart has two cavities, a thin-walled one called the auricle for receiving the returning blood poured into it from the veins, and a thick-walled one called the ventricle which receives the blood from the auricle through an orifice guarded by a valve. The function of the ventricle is to force the blood by contraction of its muscular wall into the arteries through a connecting orifice also guarded by a valve. These four chambers are called the right auricle, right ventricle, left auricle and left ventricle. The walls of the auricles are composed of red muscle and are quite thin, the work required of them being but slight, that is, they force the blood under slight resistance. The walls of the ventricles are also made up of red muscle fibres, the outer surface being smooth, the inner surface crossed by a network of beams of muscle called the trabeculae. The thickness of the wall of the right ventricle between the trabeculae is from 2 to 3 millimetres; of the left ventricle 7 to 10 millimetres. The capacity of each ventricle is about 100 cubic centimetres, that is, it forces out about this amount at each contraction.

The function of the valves is to permit the flow of liquid in one direction and to prevent its flow in the opposite direction; in other words, their presence enables a pump to maintain a flow of liquid in one direction with little or no back flow.

The heart has four valves, one between each auricle and ventricle, and one in each ventricle at its point of connection with its outgoing artery. The valve between the auricle and ventricle of the left heart is called the mitral, from its resemblance to a bishop's mitre; that between the right auricle and right ventricle is called the tricuspid from its having three folds or cusps. The left ventricle is connected with the systemic circulation by the great artery called the aorta, its guarding valve is called the aortic valve. The right ventricle is connected with the circulation through the lungs by the pulmonary artery, its valve is called the pulmonic valve. The aortic and pulmonic valves are each composed of three cups of thin, flexible tissue fastened to the inner wall of the blood-vessel, their edges hanging free, and capacious enough to meet in the middle of the orifice they guard. When the ventricles contract, the blood within them under pressure tends to escape

through any orifice, it presses upon these cups, forcing them against the walls of the orifice leading to the aorta and pulmonary artery respectively, leaving an opening of full size. In other words they offer no obstruction to the flow of blood in this direction. When, however, the muscle-wall by its contraction has emptied itself of blood through the orifices just mentioned it begins to relax, thus enlarging the cavity of the ventricle. Were there nothing to prevent, the blood just forced into the aorta and pulmonary artery under considerable pressure would flow back again into the relaxing ventricle, and so it does to a very slight degree, but this very back flow fills these three cups with blood, causing them to meet in the middle of the orifice, thus completely blocking it so far as any return of blood is concerned, and what blood has been forced into the aorta and pulmonary artery remains there to be carried on still further with the next contraction of the heart.

The mitral and tricuspid valves are simply flat folds or curtains attached to the edges of the orifices between auricles and ventricles. They are thrown back upon the inner walls of the ventricles while the blood is flowing from the auricles into the ventricles, offering little or no resistance to the flow, but when the flow of blood is in the opposite direction, that is, when the ventricles contract, they are floated upward till the free edges come in contact, thus blocking the orifice. The flaps are prevented from going too far by delicate tendinous cords attached to the free edge of the valves at one end and to the inside of the heart wall at the other end. They play the same part that sheets do for a sail. It will thus be seen that while one set of valves—mitral and tricuspid—is closed, the other set—aortic and pulmonic—will be open, and vice versa.

The period of active contraction of the ventricles is called the systole, and its time is often spoken of as the systolic period. The period of dilatation of the ventricles, the time during which they fill with blood from the auricles, is called the diastole or diastolic period. In time the two are nearly equal, the diastole being somewhat longer.

The cause of the heart beat is a matter of great interest. Inasmuch as the skeletal muscles require for contraction a stimulus carried to them through nerves, it was thought that heart muscle required a similar nerve impulse. It was known to physiologists that the heart of a frog severed from its connections went on beating in spite of there being no nerves attached to it to convey an impulse from without. Then certain nerve ganglia were found in portions of the heart wall and it was inferred that these gave out the necessary stimulus. But finally it was found that isolated portions of the heart wall in which there were no nerve ganglia continued to beat if they had a blood supply. Hence it was concluded by Gaskell that the beat of the heart must be due to an inherent rythmical power of the ventricle; the stimulus to the muscle probably residing in some chemical substance in the blood coming to the part. At any rate the ganglion theory is no longer held, while the latter is considered the probable one.

The sounds associated with the periods previously described are readily heard by anyone placing the ear over the heart of another person, or with a stethoscope the individual may hear

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his own heart sounds. The contraction of the ventricles occurs at the time the impulse is seen and felt over the apex of the heart in the fifth interspace. It is associated with a booming sound, loud and distinct. Then comes a short period of silence corresponding to the time when the heart muscle ceases its contraction and begins to relax. Then comes a very short, sharp, flapping sound due to the closure of the valves which prevent the return of the blood from the aorta and pulmonary artery to the ventricles. Then follows a longer period of silence and again a repetition of the same set of sounds. The time from the beginning of the first sound to the beginning of the second sound, that is, the time of the "boom" and its short silence, is the systole of the ventricle. The time from the beginning of the second or short, sharp sound through the period of silence following it is the diastole of the ventricle. The whole period occupied from the beginning of the first of the sounds described to its repetition is called a cycle of the heart. Of these there are on an average in an adult 72 per minute. When the successive cycles occupy the same length of time the rhythm is said to be "regular." When the times are unequal the term "irregular" is used. When a beat is dropped the term "intermittent" is applied.

If, when the ear is placed over the heart; the finger be placed over the artery in the wrist, an impulse or beat will be felt in the latter, occurring at a slightly later time, about one sixth of a second, than the apex beat. This is the pulse wave corresponding to that individual heart beat. It varies in frequency, in volume and in tension according to the number of heart beats, the volume of blood thrown into the arteries from the heart, and the tension or tone of the arterial wall. The latter point will be explained later.

The course of the blood after leaving the left ventricle is through the aorta and its branching arteries to the arms and legs and to all the organs of the body, except the main supply to the lungs, through capillaries; thence it is returned by the veins to the right auricle, from there it goes to the right ventricle, from which it is pumped through the lungs for purification to the left auricle and thence to the left ventricle again. The length of time required for any portion of blood to make the complete circuit in the human being is not known with absolute accuracy, but it is probably not less than 15 seconds nor more than 30 seconds.

The work done by the heart may be expressed in units. Assuming the pressure in the left ventricle during contraction to be 130 millimetres of mercury, each square centimetre will receive a pressure of 175.5 grams. Assuming further that the left ventricle forces 100 cubic centimetres of blood at each contraction, the work done will equal 17,880 gram centimetres. The right ventricle does a third as much work as the left, giving a total of 23,840 gram centimetres. The total work of the heart per diem equals 24,000 kilogram metres, equivalent to 56.6 kilo-calories.

The relatively high pressure required of the heart in maintaining the circulation is due to the fact that it has to force the blood into arteries having elastic walls that offer a considerable resistance to stretching. The stream from the heart into the arteries is intermittent,

the elastic arterial walls are stretched by the incoming blood absorbing the force during systole and tending to again give out this force when the heart ceases during diastole to supply fresh blood. Even during diastole the pressure within the arteries remains considerable. Hence the heart has to force the blood against the elastic tension of the arterial wall and against the blood already in the vessel from previous heart beats. This force stored up in the arterial wall tends to drive the blood along to the capillaries and veins, making in the capillaries and veins a constant flow, just as a single-cylinder pump provided with an air-chamber delivers a constant stream. The circulation, then, in the arteries is intermittent, in the capillaries and veins constant.

An element of much interest as well as of great importance to the proper maintenance of the circulation in the arteries and to the nutrition of the organs supplied by them with blood is what is called "vascular tonicity," by which is meant the peculiar property inherent in the arterial walls of maintaining a relatively constant blood pressure with varying amounts of blood contents. In an ordinary system of hydraulics maintained through elastic tubes the walls of which are stretched by the circulating contents, the pressure falls if some of the contents escape. In animals, on the contrary, a considerable quantity of blood may be withdrawn from the blood-vessels, yet the blood pressure, after a fall of very short duration, returns to the normal. This tonicity is due to the fact that the walls of the arteries have circular muscle fibres, under control of nerves, that contract down upon the blood remaining in the vessel and so maintain the pressure, a matter of great importance, as an equal pressure in organs is necessary for the proper physiological function.

The muscle in the arterial walls is supplied with two sets of nerves called vasomotor nerves, having opposite actions. One set called vasoconstrictors has the power when stimulated of contracting the vessel, the other set called vasodilators enlarges the vessel. Under normal conditions a certain equilibrium is established between the two sets of nerves and the artery is said to possess "tone." Increased action of one over the other will produce increased amount of blood in the part, as in the familiar example of blushing, or on the other hand pallor as seen in fright. Certain drugs have a powerful effect upon these nerves.

Before considering the diseases of the heart a word may be said of the historical development of the subject. That the blood circulated was not known until Harvey demonstrated it in 1628. Auenbrugger, a Viennese physician, in 1761 invented percussion, the method by which the position, size, and in a measure the changes in organs may be determined by the sound produced when the surface of the body over them is struck or "percussed," as it is technically called. His invention remained unheeded until 1806, when Corvisart, body physician to Napoleon, used it in mapping out the heart in healthy and in diseased conditions. Laennec, the founder of auscultation as used to-day, by means of his newly invented stethoscope, gave to the world in 1819 the first accurate description of the characteristics of the heart sounds and the significance of changes in the sounds in the diagnosis of diseases of the heart. Bousil-

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laud in France and Hope in England were also pioneers in this work, practically all that has been done since then being an elaboration along lines laid down by them.

By percussion the size and position of the heart can be accurately determined, and by auscultation variations from the normal sounds and the presence of abnormal sounds enable one to determine what special derangement of the heart exists.

To understand the abnormalities of the heart it should be borne in mind that the work of this organ is done by the muscle of which it is composed; that the nerve stimulus for the muscular contraction comes from within the heart wall, and that the regulatory action, that is, whether it beats faster or slower, depends upon two nerves of opposing action, the vagus and the sympathetic; stimulation of the former slowing the heart, stimulation of the latter increasing the rapidity of action. Under ordinary conditions an equilibrium is established between them, somewhat analogous to the equilibrium in a balance when equal weights are placed in the scale-pans; an equilibrium that is at once disturbed if weights are added to or taken from either pan. Furthermore intact valves are necessary for the proper function of the heart.

Hence changes in the action of the heart are due to changes in the nerve stimulation; changes in the muscle; changes in the valves. They may exist alone or in combination. Changes affecting the nerves are more commonly functional or temporary; while those affecting muscles and valves are organic and usually, though not always, permanent.

Diseases of the valves are the most frequent, the most important and of the greatest interest. A valve to perform its duty properly must be so flexible that it is readily thrown back against the walls of the heart so as not to hinder the passage of the blood through the orifice it should go. It should also quickly fall back into place and meet its fellows, so as to block the passage and prevent the flow of blood in the direction it should not go. Unfortunately these delicate valve segments are prone to inflammation, rheumatic fever being the commonest cause. This inflammation is associated with the formation of new tissue much like that formed in the scar of a wound. It leads to thickening, rigidity, retraction and deformity of the valves, and also frequently to adhesion of the cups along the edges of closure.

These changes affect the function of the valve, causing on the one hand narrowing of the orifice so that the passage of the blood is obstructed, hence the technical use of the term "obstruction," or "stenosis"; on the other hand the segments of valves may be so shortened and puckered that they do not meet each other, and so leakage results. To this condition the term "insufficiency" or "regurgitation" is applied. Either obstruction of a valve orifice or leakage through a valve calls upon the muscle of the heart for more work. In the former case the blood is forced under a greater resistance; in the latter more blood must be forced to make up for the leakage. The muscular wall thickens and the cavity of the heart behind the leaky valve enlarges to "compensate," as the expression is for the valvular defect. This compensation may remain effective for years, the patient having but little inconvenience from the disease.

Sooner or later the heart muscle feels the effect of the prolonged overwork, it weakens, becomes stretched, the cavity enclosed by it enlarges, and the condition known as "broken compensation" follows. The heart can no longer supply a sufficient amount of blood for the needs of the body, the circulation is slowed, stagnation results with the associated symptoms of distress in breathing and frequently dropsy. There is marked impairment in the functions of the organs of the body due to imperfect blood supply. Valvular disease is very common and may occur at any age, but it usually involves the valves of the left heart, mitral and aortic.

With care on the part of the patient life may often be prolonged with comfort for many years. Apart from the benefit derived from rest, the drug digitalis by prolonging diastole and stimulating the heart muscle to better contraction gives the best results. When properly used it is a great boon to the patient.

The muscle of the heart undergoes a degenerative change in acute infective diseases associated with fever, like typhoid fever, pneumonia, and diphtheria, by which its contractile power is lessened. It may reach such a degree as to lead to death from paralysis of the heart wall. If the patient recovers from the disease the heart muscle in time recovers its normal tone.

An important disease of the heart muscle is one occurring usually in males after middle life, frequently associated with the symptom known as angina pectoris. It is a degeneration of the heart wall due to partial occlusion, by thickening of the walls, of the two coronary arteries which supply the heart muscle with blood, thus disturbing the nutrition of the muscle and the nerve ganglia. Angina pectoris is characterized by the sensation of great constriction and pressure and often of a violent tearing of the heart, with intense anxiety and a feeling of impending death. The suffering is often very great, and while the attack may be of short duration the prostration following one is marked.

Fatty degeneration of the heart muscle occurs, but it cannot be diagnosed with exactness during life. Although the term is often heard its use should be reserved as an anatomical and not as a clinical diagnosis. That is, one can be sure of it only when one sees the exposed heart. On the other hand, collection of fat between the muscle-fibres and around the heart such as occurs in fat people may seriously embarrass the heart by not allowing enough space for it to move freely.

Extreme muscular effort as in lifting or carrying a heavy load or a prolonged march or climbing a mountain may overstrain the heart and lead to feeble action. Rest usually repairs the damage, although sometimes it is permanent.

Prolonged overwork and certain forms of disease of the kidney may lead to marked enlargement of the heart, due mainly to thickening of muscle wall of the left ventricle, to which the term "hypertrophy" is applied.

Disturbances of the heart function, due to some action through its nerves, are of great importance. Such may be physiological or functional, or they may be due to diseased conditions. Among the former are examples familiar to all. The increased frequency and force of the heart beat due to the emotions, to alcohol, to tea, to

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coffee, to tobacco, belong in this category. If not used to excess the effect of the above may be merely temporary, the heart resuming its usual frequency and quiet action when the effect of the stimulation has ceased. Prolonged abuse of such substances or long continued nerve worry or excitement may lead to a more permanent disturbance of the heart functions, indicated by palpitation, either permanent or after a trivial cause, or by irregularity in the rhythm. The "tobacco heart" of the milder form is an irritable one, with increased frequency of the beat; in the severer grade marked irregularity is characteristic. In the nervously tired person palpitation is common, while the uncomfortable sensations about the heart due to disturbed digestion with fermentation in the stomach often lead the individual to consult a physician feeling that heart disease exists.

A nervous disorder of the heart of considerable interest is one associated with greatly increased frequency of its beat, but with a regular rhythm, combined with a marked prominence of the eyeballs, enlarged neck (goitre) and tremor of the hands. This complex has received the name of exophthalmic goitre, a neuropathic disturbance associated with irritation of the sympathetic nerve leading to the rapid heart action.

Still more uncommon and as yet unexplained is the condition called Tachycardia (rapid heart) characterized by paroxysmal attacks of very rapid beating of the heart, lasting but a short time and followed by normal frequency. During an attack it may be impossible to count the heart or pulse beats, owing to the rapidity.

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Heart of Midlothian, The, a romance by Sir Walter Scott, published anonymously in 1818. It takes its name from the Tolbooth or old jail of Edinburgh (pulled down in 1815), where Scott imagined Effie Deans, his heroine, to have been imprisoned. The book is notable for having fewer characters than any others of Scott's novels. It has also a smaller variety of incidents, and less description of scenery.

Heart-urchin. One of a group of sea-urchins (see ECHINOIDEA) of elongated form and cordate outline from a lateral point of view. The group is best represented by the genus *Spatangus*, common in Europe, but heart-urchins occur elsewhere, and are known as fossils.

Hearts-case, a violet (q.v.), especially the common yellow violet of Europe, or a pansy.

Heat. Until the early part of the 19th century, it was generally believed that heat is a substance devoid of weight (imponderable), and diffused through the mass of bodies. This hypothetical substance was called *caloric*. Many phenomena seemed to be explained by the assumption of the existence of caloric, but finally, through the experiments of Davy and Rumford, in which heat was actually created from mechanical energy, the old caloric theory was abandoned. In its place we now have the molecular motion theory. According to this theory heat is nothing but a violent agitation of the molecules of matter. These molecules are extremely minute, but have a definite size and weight for

each definite substance. It has been estimated that a molecule of water has a diameter of about one fifty-millionth of an inch. Though molecules are small in size, their velocity, even at ordinary temperatures, is very great. In air, in which the molecules dart about in straight lines until they encounter other molecules, they attain a speed of 1,470 feet a second at the freezing temperature. The average length of their path between two encounters—the *mean free path*—is about 1-277,000 inch, and the number of molecules in a cubic inch of air is about 10 raised to the 21st power. Each molecule experiences about 5,000,000,000 collisions a second.

Expansion of Solids, Liquids, and Gases.—The molecules of any substance attract one another with a force called cohesion. It is cohesion that prevents a wire from breaking when it supports a heavy weight. The pressure of the atmosphere also helps to hold the molecules of a body together. Opposed to both of these forces is heat. The effect of the agitation of the molecules is to make them jostle one another apart. Thus it is that in general an increase of temperature results in expansion. In solids, in which the cohesion is enormous, the expansion for a given increase of temperature is very slight, especially when the test is made at low temperatures. At higher temperatures, when the molecules have somewhat weakened their mutual hold through having moved further apart, an increase of temperature equal to the previous increase generally results in a somewhat greater expansion. To express such ideas technically we employ the expression *coefficient of linear expansion*, which means the fraction of its length that a bar expands when heated one degree centigrade. As the length varies with the temperature, the length at the freezing point, 0° C., is taken as the standard length. Using then this expression, we may say that the coefficient of expansion of a solid generally increases with the temperature. The coefficient of linear expansion of a number of substances will be found in the following table:

COEFFICIENTS OF LINEAR EXPANSION OF SOLIDS.

Aluminium	0.0000233	Wood (soft).....	0.000003
Gold	0.0000144	Wood (hard).....	0.000006
Iron	0.0000121	Vulcanite	0.000067
Lead	0.0000203	Paraffin	0.000034
Platinum	0.0000090	Quartz	0.0000013
Copper	0.0000168	Rock salt.....	0.00003
Zinc	0.0000292	Ice	0.00005
Silver	0.0000193	Glass	0.0000083
Steel	0.0000123	Granite	0.0000087
Guillaume's nickel steel (36 per cent nickel)	0.00000087	Porcelain	0.0000025

Two notable cases may be remarked. It is seen from the table that the coefficient for glass is very close to that for platinum. This fact is taken advantage of in the construction of incandescent electric lamps, and of those scientific instruments where it is necessary to have a wire pass through glass and leave an air-tight joint. In making the joint, the glass around the hole is softened by heat until it gathers closely around the hot platinum wire. In cooling, if the coefficient for platinum were higher than that for glass, the platinum would contract more rapidly than the glass and leave a leaky joint. The second case to be noted is that of Guillaume's nickel steel. The coefficient of expansion of this metal is so extremely small that

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it is eminently suited to the construction of clock pendulum rods, of surveying instruments, and of standard scales of length, and to many other purposes in which much expansion now proves an annoyance. Unfortunately the high cost of nickel will preclude the employment of this wonderful alloy in some cases.

The influence of expansion is seen in railroad tracks. On a cold day 60-foot rails may contract so as to draw apart one half of an inch. The cables of the Brooklyn Bridge support the slightly arched roadway. When they sag down in hot weather through expansion, they tend to make the roadway buckle. This tendency is increased by the expansion of the roadway itself. However, both tendencies were overcome through the foresight of the engineers, who provided a telescoping joint in the roadway at the middle of the span. The parts of this joint play in and out about a foot. On hot days clock pendulums grow longer, and so the clocks lose time. Glass when suddenly and hence unevenly heated, expands more at one point than at another, thus introducing internal strains that cause fracture, but vessels made of vitrified quartz, on account of their extremely low expansibility, resist this tendency to crack; they will endure without injury the sudden application of a blowpipe flame.

In liquids the molecules are so far freed from cohesion that they are able to roll around one another and to wander from one position to another. The small remaining cohesion is assisted by the pressure of the atmosphere or by any other pressure to which the liquid may be subjected and so the molecules in the body of the liquid are prevented from flying directly apart. It is on account of this small resistance to expansion that we find liquids very much more expandible than solids. The term *coefficient of cubical expansion* is employed to express the degree of expansibility of a liquid. It means the fraction of its volume that a liquid expands when its temperature is raised one degree centigrade. The cubical coefficient of a substance is three times as great as its linear coefficient, because we measure the effect of expansion in length, breadth, and thickness, instead of merely noting the expansion in length. Of course a liquid confined in a tube of unchanging dimension could only expand in length, but the effect in this one direction would be three times as much as it would be if the liquid were allowed to expand proportionally in all three dimensions.

COEFFICIENTS OF CUBICAL EXPANSION, LIQUIDS.

Ethyl alcohol.....0.00106	Petroleum
Methyl alcohol.....0.00114	(heavy).....0.00096
Acetone.....0.00135	Mercury.....0.00018153
Ether.....0.00148	Aniline.....0.00118
Olive oil.....0.00080	

The expansibility of water is strikingly irregular. Starting at the freezing point, water contracts as the temperature rises until at about 4° C. it has assumed its maximum density. A further increase of temperature now causes the water to expand, which it does at an increasing rate until it begins to boil at 100° C.

Gases surpass even liquids in their expansibility. Because in gases the molecules are relatively very far apart, cohesion counts for nearly nothing, leaving external pressure as almost the sole force restraining expansion. It appears that the coefficient of expansion of a gas is near-

ly independent of the external pressure, for though a greater pressure tends to restrain expansion more, the greater crowding of the molecules resulting from this pressure causes more frequent blows among the molecules, and makes the expansive force increase in nearly the same proportion as the external pressure. This law is not perfectly complied with because the molecules in a gas are not quite free from cohesion, especially when much compressed, and because the diameter of the molecule is an appreciable fraction of the distance between two molecules. Another law, fulfilled only approximately for the same reasons, is that all gases have the same coefficient of expansion, as will be seen in the following table, which gives the cubical coefficient referred as a standard to the volume the gas has at 0° C.

COEFFICIENTS OF CUBICAL EXPANSION, GASES AT A PRESSURE OF FROM 300 TO 500 MM.

Air.....0.003667	Carbon dioxide....0.003710
Hydrogen.....0.003661	Nitrous oxide.....0.003719
Nitrogen.....0.003661	Cyanogen.....0.003877
Carbon monoxide.0.003667	Sulphur dioxide...0.003903

The Convection of Heat.—When the air in contact with a hot stove becomes warmed, it expands and grows lighter than the other air. Owing to unbalanced forces the hot air rises to the ceiling and then spreads out to the walls. It there becomes cooled, and therefore contracts and becomes dense. As a result it descends at the walls and finally returns to the stove only to start again on the journey. During this process, called *convection*, heat is carried by the air from the stove to the most distant parts of the room. Winds consist of convection currents in the atmosphere. Some parts of the earth's surface become more highly heated by the sun than others. The air over the hot areas expands and becomes specifically lighter than the surrounding air. The general result is that the hot air is forced to rise giving place to the surrounding cooler air which blows toward the hot area as a surface wind. The hot air risen aloft spreads away toward the cool regions as an upper wind. Corresponding to the ascent of air over the hot areas is a descent of air over the cool areas. Much heat is brought from the tropical regions to temperate regions by regular winds.

Convection phenomena also occur in liquids. A large vessel of water supplied with heat at one side of the bottom becomes through the action of convection currents uniformly heated throughout. Much heat is conveyed from the equator toward the poles by means of the Gulf Stream and other ocean currents. It is probable, however, that with ocean currents differences of temperature have little to do with the motion of the water, but that the motion is caused chiefly by the action of winds that blow with great steadiness in a westerly direction across the equatorial portions of the great oceans. Difference in salinity of the ocean at different latitudes may possibly be a partial cause of the phenomenon.

Thermometry.—Before proceeding further in the discussion of heat phenomena, it will be necessary to describe some of the methods employed for measuring temperature or the degree of hotness of a body. Most commonly the methods depend upon the property of expansion. In ordinary thermometers the expanding body is either mercury or colored alcohol. The

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liquid, say mercury, is held in a glass tube having a fine bore and at one end a spherical or cylindrical bulb, the other end being simply closed. Above the mercury, which fills the bulb and part of the stem, is a space that is free from air and contains only a small amount of mercury vapor. When the thermometer is warmed, the mercury rises in the tube because the cubical expansion of mercury is greater than the cubical expansion of glass. The glass tube is provided with a scale, sometimes engraved directly on the tube, and sometimes engraved on some other material and mounted at the back of the tube. For a Fahrenheit scale, division number 32 is placed opposite the mercury level when the thermometer is placed in pure crushed melting ice, and division number 212 is placed opposite the mercury level when the thermometer is placed in saturated steam over boiling water. As the temperature of the boiling point depends upon the atmospheric pressure, which is ever varying, the standard boiling point is taken to correspond to the average atmospheric pressure, which is measured by a barometric column of 760 millimetres. The space between these marks, the freezing and boiling points, is divided into 180 equal divisions, and then divisions equal to these are extended above the boiling point and below the freezing point. For the centigrade scale, which is generally employed in scientific work, the freezing point on the thermometer is marked 0° and the boiling point 100° . For the Réaumur scale, much used for household purposes in Germany, these points are marked 0° and 80° respectively, and finally for the De Lisle scale, which is used in Russia, the direction of the graduation is reversed, the boiling point being marked 0° and the freezing point $+150^{\circ}$. With this last thermometer, the greater the intensity of the cold the higher the number representing the temperature. Mercury thermometers permit of the measurement of rather high temperatures, mercury not boiling until the temperature of about 357° C. (674.3° F.) is reached. Still higher temperatures with mercury thermometers may be reached by checking the vaporization of the mercury through the introduction into the upper part of the tube of a compressed gas such as nitrogen. With such a thermometer the only limitation is the softening of the glass at high heats, and even this trouble is largely lessened by the use of vitrified quartz for the material of the bulb. On the other hand, mercury freezes at about -39° C. (-38.2° F.) and so becomes useless for indicating temperatures lower than this. For these lower temperatures alcohol may be employed as the thermometric substance because it resists freezing until temperatures far below any met with in nature are encountered. In addition to this advantage alcohol expands much more rapidly than mercury, thus permitting a much larger bore for the same length of degree. However, for very high temperatures alcohol is not available, as it boils at the moderate temperature of 78.3° C. (173° F.).

In practical work thermometry fairly bristles with errors. For several months after a thermometer is made the bulb gradually shrinks, probably owing to some molecular instability in the glass caused by the excessive heating employed in the process of blowing the bulb. This causes the thermometer to read too high. After

each time a thermometer is used for a very high temperature the bulb on cooling fails to contract promptly to the volume proper to the new temperature, and so now the thermometer for a while reads too low; however, prolonged heating at the temperature of boiling mercury tends to put the glass into a more stable state. Also such troubles are much reduced by the use of hard glass instead of soft glass for the bulbs. Errors also arise from the following causes: non-uniformity of the bore; variations of atmospheric pressure, which cause a yielding of the bulb; failure to have the stem of the thermometer at the same temperature as the bulb; the hydrostatic pressure on the bulb due to the liquid being tested, especially when the thermometer is sunk to great depths; a variation in the internal pressure of the mercury itself on the bulb when the thermometer is inclined from the vertical position to the horizontal; a peculiar jerking motion of the mercury when it ascends a very fine bore; the fact that equal volumes of the bore marked off on the tube do not represent equal expansions of the mercury, since at high temperatures the volume of the bore indicating a degree has increased (this is quite distinct from the matter of the relative expansion of glass and mercury); irregularities in the expansion of the glass of the thermometer; and lastly irregularities in the expansion of the fluid itself, be it mercury, alcohol, air, or any other substance. This last source of error is worth much consideration because two thermometers otherwise perfect but containing different liquids, as alcohol and mercury, fail to agree in their indications. Further, we have no right arbitrarily to select any particular fluid as a standard and yet feel that our temperature scale has anything more than an empirical value. It will, however, be explained in the last section how a theoretical definition for temperature measurement can be formulated (the thermodynamic scale), agreeing fairly with ordinary thermometers, very closely with the hydrogen or nitrogen thermometer, and perfectly free from ambiguity.

In the hydrogen thermometer advantage is taken of the increase of pressure of a gas attending an increase of temperature, the volume of the gas being kept constant. The hydrogen is confined in a glass bulb about two inches in diameter which is connected by a thick-walled capillary tube with the top of one side of a U-shaped apparatus consisting of two vertical glass tubes connected by a rubber hose at their lower ends and partly filled with mercury. When the hydrogen in the bulb is warmed it tends to expand and push the mercury down its side of the U and to cause it to rise on the other side, which is open to the atmosphere. This effect is counteracted by raising the glass tube on the open side, the rubber tubing allowing this to be done. The extra back pressure of the mercury forces the hydrogen back to its former volume. In measuring the pressure to which the hydrogen at any time is subjected, the difference in level of the mercury columns must have added to it the length of the barometric column measured at the time. For each degree centigrade added to the temperature, the hydrogen is found to increase in pressure about $1/273$ of its pressure measured at 0° C. Similarly for each degree subtracted, the pressure decreases $1/273$ of the pressure at 0° C.

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If this law held to the limit, we would conclude that at -273° C. the hydrogen would lose all its pressure, thus indicating the cessation of all molecular motion—a veritable absolute zero of temperature. However, at extremely low temperatures the perfect working of this law is interfered with through the dominance of cohesion which reduces unduly the pressure of the hydrogen, and may cause it to assume the liquid or even the solid state. Nevertheless, this limiting temperature as predicted by the hydrogen thermometer agrees almost exactly with the true absolute zero of the thermodynamic scale referred to above. On this absolute scale the temperature of freezing water is approximately $+273^{\circ}$ Abs., and temperature of boiling, $+373^{\circ}$ Abs.

Other methods of measuring temperature depend upon change in the electrical resistance of platinum, and upon the electromotive force created when the juncture of two dissimilar metals, as platinum and rhodium, is heated. Very high and very low temperatures may be measured by such methods.

Conduction of Heat.—When a sterling silver spoon is placed in a cup of hot tea, the handle of the spoon soon becomes uncomfortably warm to the hand. Heat has been conducted through the silver. The molecules in the bowl of the spoon are the first to have their motion accelerated by contact with the tea. This extra motion is communicated to their neighbors which in turn pass it on until, step by step, the motion reaches the molecules in the handle. It appears that in some substances the character of connection between the molecules is more favorable to conduction than in others. As we might have expected, from the mutual grip of the molecules found in solids, that class of bodies furnishes the best conductors; but in gases, in which the molecules are very loosely distributed, we naturally find the poorest conductors. Liquids as conductors occupy a position intermediate between solids and gases. Metals surpass all other materials in conducting power, silver standing at the very head of the list, while near the foot of the list of solids are found organic materials and mineral substances, especially when in the porous or fibrous state, such as horn, leather, magnesia brick, asbestos fibre, sand, cotton wool, cowhair felt, and down. Great value is attached to poor conductors of heat. They are called insulators. Bone is used in joining the handles to silver tea pots. Our clothes are made of organic material woven so as to leave a multitude of fine pores, a condition favorable to insulation and met with in the fur of animals and in the feathers of birds. Saw dust and mineral wool for the same reason are made to serve as insulators of heat in the outer casing of ice boxes.

In the following table of conductivities the better conductors have the higher numbers. These numbers, called the *coefficient of conductivity*, indicate the amount of heat energy measured in calories (a *calorie* is the amount of heat energy required to raise the temperature of a gram of water one degree centigrade) conducted from one face to the opposite face of a centimetre cube of the substance when one of the faces is maintained one degree hotter than the other. The amount of heat energy conducted is proportional to the difference in temperature between the opposite faces.

COEFFICIENTS OF CONDUCTIVITY.

	Degrees Cent.		
Aluminium	at 0	0.343	Slate .....0.00272
Aluminium	at 100	0.362	Granite .....0.0053
Bismuth	at 0	0.0177	Marble .....0.0050
Bismuth	at 100	0.0164	Sand, white.....0.00093
Brass	at 0	0.2041	Snow, compact.....0.00051
Brass	at 100	0.2540	Vulcanite .....0.0004
Copper	at 0	0.7189	Wood, fir—
Copper	at 100	0.7226	Along grain.....0.0003
Iron	at 0	0.166	Across grain.....0.00009
Iron	at 100	0.163	Bees'-wax .....0.00009
Lead	at 0	0.0836	Ether .....0.0003
Lead	at 100	0.0764	Water .....0.002
Silver	at 0	0.960	Air .....0.000056
Zinc	at 0	0.303	Hydrogen .....0.00039
Mercury		0.0152	

Specific Heat.—In the last section the expression "heat energy" was employed, and the "calorie," its unit, was defined. If thin glass vessels containing equal weights at equal temperatures of different materials, mercury and water for example, be placed over equal gas flames so as to receive in a given time equal amounts of heat energy (equal numbers of calories), it will be found that the water will require nearly 30 minutes to get as hot as the mercury does in one minute. The water is said to have a greater capacity for heat than the mercury has. Making allowance for the heat capacity of the glass vessels and for radiation and conduction it is found that the heat capacity of mercury is 0.034 that of water. We say that the *specific heat* of the mercury is 0.034, for water is taken as the standard and to its heat capacity is assigned the value 1.0. The value of the specific heat of a number of solids and liquids is given in the following tables:

SPECIFIC HEAT OF SOLIDS.

SUBSTANCE	A Atomic Weight	B Specific Heat	C=A×B Atomic Heat
Aluminum	27.04	0.2022	5.45
Bismuth	207.5	0.0298	6.17
Copper	63.18	0.09232	5.82
Gold	195.74	0.03035	5.94
Iron	55.88	0.10983	6.13
Lead	206.39	0.0315	6.50
Nickel	58.24	0.10842	6.31
Platinum	194.3	0.03147	6.09
Silver	107.66	0.0559	6.10
Sulphur	31.98	0.1844	6.02
Tin	117.35	0.0559	6.65
Zinc	64.88	0.0935	6.05
Ice		0.502	.....
Paraffin		0.694	.....
Glass		0.19	.....
Wood		0.6	.....
Quartz		0.186	.....
Rock Salt		0.219	.....
Gypsum		0.26	.....
Ruby		0.22	.....
Brass		0.093	.....

SPECIFIC HEAT OF LIQUIDS.

Acetone .....	.53	Glycerine .....	.55
Alcohol, Ethyl .....	.65	Mercury .....	.034
Benzol .....	.44	Carbon disulphide...	.24
Bromine .....	.46	Turpentine .....	.46
Ether .....	.54		

In the first table the atomic weights (the weight of the atom as compared with the weight of an atom of hydrogen) of some of the elements in the solid state are also given. The product obtained by multiplying the specific heat by the atomic weight is given in the last column. It will be observed that these products are approxi-

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mately equal. This equality indicates that if we took as our standard of comparison equal numbers of atoms of a solid instead of equal weights, all elements in the solid state would have the same heat capacity. It takes about as much heat energy to raise the temperature of an atom of gold one degree as it does for one atom of aluminium. This law of Dulong and Petit also applies with some degree of approximation to compounds in the solid state—not equal heat capacity for the molecules, but for the atoms.

In the cases of gases we have two specific heats according as, on the one hand, the gas is confined to constant volume while being heated, or as, on the other hand, the gas is allowed to expand so as to keep the pressure constant. This is shown in the accompanying table, where it will be seen that the specific heat at constant pressure is greater than the specific heat at constant volume.

SPECIFIC HEATS OF GASES.

SUBSTANCE	Symbol	Constant vol- ume equal weights	Constant pressure		Ratio of spe- cific heats, equal cal. 3 4 + 1 cal. 3
			Equal weights	Equal volumes	
Air .....	.....	.1692	.2374	.2374	1.403
Mercury vapor. Hg .....	.....	.....	.....	.....	1.660
Argon	Ar .....	.....	.....	.....	1.63
Carb. monoxide. Co .....	.....	.1746	.2450	.2370	1.403
Oxygen	O ₂ .....	.1542	.2174	.2405	1.41
Hydrogen	H ₂	2.417	3.4090	.2359	1.41
Nitrogen	N ₂ .....	.1729	.2438	.2370	1.41
Chlorine	Cl ₂ .....	.0913	.1210	.2962	1.336
Carbon dioxide. CO ₂ .....	.....	.1654	.2169	.3307	1.311
Ether	C ₄ H ₁₀ O .....	.467	.4810	1.2296	1.03

This difference in specific heat in the same gas is due to two causes. When the gas expands, not only do the molecules acquire greater kinetic energy, but in pushing each other farther apart against the attractive force of cohesion, they require a further amount of energy of the potential sort, and in pushing back the restraining pressure of the atmosphere still another large supply of energy is needed. It appears from several independent considerations that in gases far removed from their liquefying points the cohesion effect is exceedingly small, and so we conclude that the excess of specific heat of an expanding gas is almost entirely due to work done on the external pressure applied to the gas.

In the last column of the table the ratio of the two specific heats of the gases is given. This ratio is found to vary, decreasing from simple gases like mercury vapor, the molecules of which have single atoms, to complex gases like ether vapor, the molecules of which have 15 atoms. With complex molecules a large part of the energy is internal, much being stored up in the rotating motion of the individual molecules, and in the relative motion of their atoms, leaving the energy of translation of the molecules and the energy due to the pushing back of the external pressure about as for mercury vapor. It follows then that the energy associated with the external pressure is a smaller fraction of the whole energy, and that therefore, as observed, the ratio between the heat energy imparted to an expand-

ing gas and the energy imparted to a non-expanding gas must be smaller for such complex molecules. The value of this ratio is the principal means of judging of the number of atoms in a molecule of an element in the gaseous state.

Before leaving this subject it should be remarked that the specific heat of water varies slightly with the temperature, and so it is convenient to take as the value of the calorie one hundredth the heat required to raise the temperature of a gram of water from 0° C. to 100° C.

Latent Heat.—If heat energy be imparted to a mass of ice at the point of melting, the ice will proceed to melt, but will not grow any warmer as it does so. The heat energy thus added without increasing temperature is called *latent heat*. Latent heat is devoted only to shaking the molecules of ice asunder, not to increasing their speed. Temperature depends upon the energy of motion (kinetic energy) of the molecules; latent heat only stores up energy of position (potential energy) of the molecules, and so does not produce an increase of temperature (this simple statement must be modified in cases of change of polymerization). Again, when water is being boiled, a large amount of heat energy becomes latent. The latent heat of vaporization and of melting for a variety of substances is given below.

LATENT HEAT OF VAPORIZATION.

	Calories		Calories
Water	536	Mercury	62
Acetone	126	Carbon disulphide..	90
Ethyl alcohol.	206	Sulphur	362
Methyl alcohol.	264	Ether	91
Liquid air.....	47		

LATENT HEAT OF MELTING.

	Calories		Calories
Ice	80	Silver	21.07
Sulphur	9.37	Mercury	2.82
Paraffin	35.10	Iron	35
Phosphorus	5	Platinum	27
Bees'-wax	42	Tin	14
Zinc	28.13	Bismuth	13
Lead	5.86	Copper	30

It should be remarked that the latent heat devoted to converting a liquid into vapor, besides increasing the internal potential energy of the molecules, also does work in pushing back the atmosphere, but with water this external work bears a very small ratio to the internal work against cohesion, namely, a little more than one twelfth.

Heretofore we have supposed the energy for melting or for vaporization to be derived from some external source of heat. It is, however, possible to secure a change of state through the consumption of the heat energy of the body itself. If water be left in an open vessel it will presently have evaporated entirely away. During the progress of this vaporization a thermometer placed either in the water or in the moist air above the water will show a temperature lower than that of the surrounding air. The reason of this is as follows: At the surface of the liquid, with all the irregularities of position and velocity possessed by the molecules, some of them find opportunity to fly off from the liquid surface. On the average it will be the faster going molecules that spring away first, thus leaving the more slowly going ones behind, which is the same as saying that the remaining liquid is cooler. Also in going away, the

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molecules fly against the back pull of cohesion, and so their velocity is checked. Indeed many are entirely stopped and drawn back into the liquid, though others escape quite beyond the range of cohesion of the liquid and diffuse among the molecules of the air. The reduced motion of these escaping molecules causes the low temperature referred to above of the vapor. Common illustrations of cold by evaporation are frequently met with. The function of perspiration is a means of regulating the temperature of the human body. In the healthy state when we are overheated the skin becomes very moist, and the evaporation of this moisture, assisted by a breeze or by fanning, cools the surface. In disease the proper action of the skin may be interfered with, and becoming dry, may fail through lack of evaporation to provide the normal cooling effect. An exalted temperature of the body ensues; in other words, a fever. Certain drugs tend to promote perspiration and thus reduce the temperature of the patient. Another large factor in the temperature regulation of the body is in the water evaporated from the lungs in the process of breathing. The evaporation of ammonia that has been liquefied by pressure furnishes the cold employed in some ice machines. In the case of liquefaction the necessary latent heat may be derived from the body itself. This occurs when a salt is dissolved in water, a process that is generally accompanied by a fall of temperature, though occasionally a rise in temperature is noted. The factors governing the result in such cases are rather complicated. We have to take account of the work done by the solvent in tearing molecules away from the solid lump and in some cases the tearing of these molecules apart into electrically charged parts called ions. On the other hand a certain amount of kinetic energy is furnished by the attraction of the molecules of the dissolving substance by the molecules of the solvent. According as the back pulls or the forward pulls predominate, will the temperature of the solution be lowered or raised. If much chemical action takes place between the substance and the solvent, the solution is almost always warmed.

The temperature at which melting takes place depends upon external pressure. When a solid like paraffin expands on liquefying, high pressure, which resists expansion, stops melting until a temperature slightly higher than the ordinary melting point is reached. Paraffin that under ordinary conditions melts at 46.3°C . melts at 49.9°C . when subjected to the additional pressure of 100 atmospheres. In the case of ice, which contracts on melting, melting is favored by pressure. The addition of one atmosphere of pressure lowers the melting point of ice by 0.0072°C . This fact accounts for the slipperiness of ice, especially when being skated upon. The sharp edge of the skate exerts great pressure on the ice below it, which melts and furnishes a lubricating film of water. This film of water is cooler than the ice furnishing it, some of the heat of the ice having become latent, and as soon as the skate has passed over, the water immediately resumes the solid state. This process of freezing again is called regelation. Regelation is an important factor in glacier motion. The ice as it follows down a tortuous valley is continually being cracked. After the settling following

this cracking, the great pressure from the upper ice fields melts the ice at the points of contact of opposite sides of a fracture, and the escaping undercooled water freezes again, thus healing the fracture. In this way the glacier appears to follow down the irregularities of a valley as would a very viscous mass.

MELTING POINTS.

	Degrees Centigrade		Degrees Centigrade
Paraffin	55	Bismuth	270
Ice	0	Cadmium	318
Silver chloride.....	450	Copper, pure in air..	1065
Fluor spar.....	900	Copper, pure, air	
Potassium nitrate....	340	excluded.....	1084
Salt, common.....	800	Iron	1600
Spermaceti	44	Lead	330
Sugar, crystals.....	170	Mercury	-39
Bees'-wax	63	Nickel	1500
Brass	900	Palladium	1700
Glass, crown.....	400	Platinum	900
Gold	1064	Rhodium	2000
Cast iron, gray.....	1200	Selenium	216
Cast iron, white.....	1100	Silver	1000
Silver, sterling.....	900	Sulphur	114
Steel, cast.....	1400	Tin	230
Hydrogen	-255	Zinc, pure.....	419
Oxygen	-191	Manganese (99%)...	1245
Aluminium, pure.....	657	Chromium (99% free	
Antimony	440	from carbon).....	1515

Saturated and Unsaturated Vapors.—When a liquid, water for example, is placed in a vacuum enclosure kept at constant temperature by artificial means, it immediately begins to evaporate, the vapor presently attaining a maximum density and pressure. The vapor as well as the space occupied by it is then said to be *saturated*. Before this maximum pressure was reached the vapor was unsaturated. If the temperature of the whole apparatus be now raised, more water will commence to evaporate, and the vapor will increase in density and pressure before it is again saturated. Had the saturated vapor formed in the first place been shut off from the water surface before raising the temperature, it would not become as dense as when it had the water evaporating into it, and so we would then pronounce the heated saturated vapor as unsaturated. On the other hand if a mass of unsaturated water vapor be cooled, the density of the vapor will at a certain temperature be sufficient to cause saturation. Below this particular temperature, called the *dew-point*, some of the moisture will condense. In some cases, however, when there are no nuclei in the form of dust particles, free ions, etc., the vapor may cool appreciably below the dew-point without immediate condensation. The vapor is then said to be supersaturated. The presence of air has only a very small influence on the density and pressure of saturated water vapor in contact with water, especially when the temperature is not high.

When the temperature of water or other volatile liquid is raised so high that the pressure of the saturated vapor becomes as great as that of the atmosphere, bubbles of the vapor begin to form in the body of the liquid. This constitutes the process of boiling. The temperature at which a liquid boils is much influenced by the external pressure. The boiling point is the same as the temperature at which the pressure of the saturated vapor equals the external pressure on the bubble. In the following table these temperatures with their corresponding pressures are given for water.

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PRESSURE OF WATER VAPOR.

Temperature degrees centigrade	Pressure in millimetres of mercury	Temperature degrees centigrade	Pressure in millimetres of mercury
—10	2.08	50	91.98
—5	3.14	55	117.48
0	4.60	60	148.79
+5	6.53	65	186.94
10	9.16	70	233.09
15	12.70	75	288.52
20	17.39	80	354.64
25	23.55	85	433.41
30	31.55	90	525.45
35	41.83	95	633.78
40	54.91	100	760.00
45	71.39	101	787.63

Degrees centigrade	Pressure in atmospheres	Degrees centigrade	Pressure in atmospheres
100.	1	198.8	15
112.2	1½	201.9	16
120.6	2	204.9	17
133.9	3	207.7	18
144.0	4	210.4	19
152.2	5	213.0	20
156.2	6	215.5	21
165.3	7	217.9	22
170.8	8	220.3	23
175.8	9	222.5	24
180.3	10	224.7	25
184.5	11	226.8	26
188.4	12	228.9	27
192.1	13	230.9	28
195.5	14		

BOILING POINTS OF LIQUIDS.

	Degrees Centigrade		Degrees Centigrade
Hydrogen	—246.	Sulphur dioxide..	—10.1
Helium	—240.7	Ether	+34.6
Nitrogen	—196.5	Carbon disulphide	+46.2
Air		Acetone	+57.
Argon	—186.1	Chloroform	+60.2
Oxygen	—182.7	Methyl alcohol....	+64.9
Fluorine	—187.	Ethyl alcohol....	+78.3
Krypton	—152.7	Benzol	+80.2
Xenon	—109.9	Water	+100.0
Ethylene	—102.	Amyl acetate....	+150.0
Nitrous oxide....	—89.	Aniline	+184.4
Carbon dioxide		Sulphuric acid....	+330.7
(sub-limes)....	—80.	Sulphur	+448.4
Chlorine	—33.6	Mercury	+356.8
Ammonia	—32.9	Zinc	+958.

A saturated vapor in contact with its liquid offers a beautiful instance of dynamic equilibrium. We conceive that molecules are ever leaving the surface of the water, adding themselves to the vapor. At the same time molecules of the vapor coming near to the liquid surface or plunging into it are caught by the cohesion of the liquid, thus subtracting themselves from the vapor. A less dense vapor would lessen the latter process and would allow the vapor to grow denser; a denser vapor would increase it and allow the vapor to fall to a state—the saturated state—when the rate of evaporation is just equal to the rate of condensation.

The degree of moistness of air is expressed by the phrase *hygrometric state*. The hygrometric state does not express the density of the water vapor present, but, instead, expresses the quotient obtained by dividing the density of the vapor present by the density of the vapor required to saturate the air. If pressures were employed instead of densities in getting the quotient, substantially the same result would be obtained. Still another common way of defining hygrometric state is to take the quotient obtained by dividing the pressure of the vapor corresponding to the dew-point by the pressure of vapor saturated at the temperature of the air, a method closely agreeing with the former ones.

The Critical State.—When the temperature rises, the density of a saturated vapor in contact with its liquid becomes denser, while the liquid itself expands and becomes less dense. If the heating of the liquid and vapor takes place in a strong closed vessel containing not too much or too little of the liquid, after a while a temperature is reached at which the saturated vapor becomes as dense as the liquid. At this point they become identical in their physical properties; the line of demarkation of liquid and vapor fades away, and the two fluids begin to mix. The temperature at which this phenomenon occurs is called the *critical temperature*; the corresponding pressure is called the *critical pressure*, and the liquid is said to be at the *critical state*. Above the critical temperature it is impossible to distinguish between a liquid and its vapor. No matter how great the pressure, a gas or vapor cannot be forced into the state of a liquid that is obviously distinct from the vapor unless the vapor be cooled below the critical temperature.

CRITICAL TEMPERATURES AND PRESSURES.

SUBSTANCE	Critical Temperature Degrees Centigrade	Critical Pressure Atmospheres
Hydrogen	—225.	15.
Oxygen	—118.8	50.8
Nitrogen	—146.	35.
Carbon monoxide....	—141.	36.
Argon	—120.	40.
Fluorine	—121.	50.6
Methane	+95.5	50.
Carbon dioxide....	+31.	75.
Ammonia	+130.0	115.
Sulphur dioxide....	+155.4	80.
Chlorine	+144.0	83.9
Nitrous oxide....	+35.	75.
Water	+365.	200.
Ethane	+34.	50.2
Ethylene	+10.	51.7

Radiation.—We have described two methods by which heat energy may be transferred from one place to another—by conduction and by convection. A third method remains to be studied. How does the heat of the sun reach us? By means of waves in the luminiferous ether. Go to a quiet pond in which a piece of wood may be floating. Standing on the shore, vibrate your hand up and down in the water. Waves run from your hand over the surface of the water to the wood and cause it to vibrate up and down. Energy from the hand has been transferred to the wood by means of waves. These waves consist of the successive vibration of successive particles of water, each particle receiving energy from behind and passing it on to the front. It is much the same with heat waves. The ether, which fills all space, is capable of being set into vibration by vibrating molecules and of handing this vibration on step by step in the form of waves. Molecules acted upon by these waves are themselves set into vibration. The vibrating molecules of the sun generate ether waves, and the ether waves generate vibration of the molecules of bodies on the earth. These ether waves are called *radiant heat*. We now have a very wide range of ether waves under experimental control. From the large waves generated by electrical oscillations used in wireless telegraphy

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and sometimes a mile long we may pass by insensible gradations, with only two breaks, to the extremely minute waves supposed to constitute Roentgen's X rays and the Gamma rays of radium. Dark heat waves or infra-red rays, ordinary light, and ultra-violet light belong to the middle of the series. The shortest electrical waves thus far tested are about one tenth of an inch long, while the length of the longest heat waves is about $1/300$ inch. The shortest ultra-violet waves are about $1/250,000$ inch long. All ether waves have the same velocity as light, namely, 186,300 miles a second. All may be reflected, refracted, and polarized; and may be absorbed by transmission to a degree depending upon the substance used for transmission and the particular wave-length of the rays.

Thermodynamics.—The most cogent reason for discarding the caloric theory of heat is that heat may be generated from that which is not in any sense substance—heat may be derived from mechanical energy. Heat is generated when a brass button is rubbed on the carpet, when a bullet is struck with a hammer, and when two pieces of ice are rubbed together, a process resulting in their melting. The relation between mechanical energy and the heat energy generated by its consumption was first carefully investigated by J. P. Joule before 1850. One pound-calorie of heat energy is obtained from 1,400 foot-pounds of mechanical energy. That is to say, the energy due to the fall of 1,400 pounds through the distance of a foot is sufficient if transformed into heat to raise the temperature of a pound of water through one degree centigrade. This number of foot-pounds is called the *mechanical equivalent of heat*, for it has been found that the process is reversible. When by means of an air-engine or a steam-engine one pound-calorie of heat is consumed in generating mechanical energy, 1,400 foot-pounds of the latter are obtained. The *first law of thermodynamics* states that when mechanical energy is converted into heat, or when heat is converted into mechanical energy, the quantity of mechanical energy is equivalent to the quantity of heat energy. The *second law of thermodynamics* states that it is impossible for a machine without the consumption of external energy to make heat pass from a body at a low temperature to one at a high temperature. When external energy is supplied, the transfer of heat becomes possible through the use of a reversible engine. A reversible engine is one that, while it may, on the one hand, take heat from a high temperature source and transfer it to a low temperature escape with a conversion of a definite portion of the heat into mechanical energy, may, on the other hand, when its operation is reversed by the application of external mechanical energy equal in amount to that generated in the first operation, take back the same heat from the low temperature escape and transfer it, together with an amount of heat equal to that lost in the first operation, to the high temperature source. The fraction of the heat leaving the high temperature source converted into mechanical energy, or, when the engine is reversed, the fraction of the heat entering the high temperature source obtained from the mechanical energy applied has been shown by Carnot to be the same for all

reversible engines of whatever nature and working with any substance whatsoever, provided they work between the same temperatures. This fraction may be called the *thermodynamic efficiency* of the engine. The thermodynamic efficiency of good steam-engines occasionally exceeds 20 per cent. This means that 20 per cent of the heat energy supplied to engine is transformed into mechanical energy, the remaining 80 per cent escaping unused at the condenser or exhaust.

Using the provisional absolute scale as indicated by a hydrogen thermometer, experiment shows that the efficiency, W/H , is roughly represented by the following equation in which W stands for the mechanical energy realized, H for the heat (measured in the equivalent foot-pounds) leaving the high temperature source, T for the temperature of the source, and T^1 for the temperature of the cooler escape.

$$\frac{W}{H} = \frac{T - T^1}{T}$$

This suggests a new definition for a temperature scale, namely that numerical values of temperatures be so adjusted as to fulfil *exactly* the above formula. Since the formula only fixes a ratio between the temperatures T and T^1 corresponding to a given efficiency, an infinite number of sets of numerical values for these temperatures could be found to satisfy the formula. But if it be decided that a definite numerical range, say one hundred degrees, be comprised between the freezing and boiling points of water, only one set of values becomes possible. This decision makes the value of the freezing point very nearly $+273^\circ$ Abs., and the value of the boiling point $+370^\circ$ Abs. Lord Kelvin was the first to propose this *thermodynamic scale*. Theory shows that its indications would correspond exactly to a thermometer containing a perfect gas. Hydrogen is not quite a perfect gas, for its molecules attract each other slightly and they occupy an appreciable fraction of the space holding the gas. Hence there are small deviations of the hydrogen thermometer from the thermodynamic scale, especially at low temperatures. In spite of these difficulties much progress in the realization of the thermodynamic scale has been achieved through ingenious mathematical considerations relating to two sets of experimental observations: those made by Regnault on the expansion and on the increase of pressure of hydrogen and other gases when heated, and those made by Joule and Kelvin on the temperature changes suffered by gases in passing through a porous plug. Nevertheless, the thermodynamic scale offers us a theoretical ideal which is independent of the thermal properties of any particular substance, but is only related in a definite way to a fixed universal law.

When a *small* amount of heat is transferred from or to a gram of a substance, the heat transferred (measured in calories), divided by the average absolute temperature of the substance at the time of the transference is called the *change of entropy* of the substance. For convenience, the zero of entropy is generally taken to correspond to water at the freezing point and under the normal atmospheric pressure. It may be shown that when two bodies at different temperatures are

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placed in contact and their temperatures become equalized, the average entropy rises, for from the above definition of entropy, the heat leaving the hotter body must reduce its entropy less than it increases the entropy of the cooler body into which the heat enters. Consequently the average entropy of the universe is constantly rising and tending toward a maximum. At the same time the availability of the energy of the universe is tending toward zero.

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Heath, Daniel Collamore, American publisher: b. Salem, Maine, 26 Oct. 1843; d. 29 Jan. 1908. He was graduated from Amherst in 1868, became a junior member of the firm of Ginn and Heath, publishers of Boston, and in 1886 established in Boston the house of D. C. Heath & Company, publishers of text-books for schools and colleges, with branch offices in New York, Chicago and London.

Heath, Francis George, English writer: b. Totnes, Devon, 15 Jan. 1843. He entered the civil service as a clerk of the higher division in the customs department in 1862, and was transferred as surveyor to the outdoor division of that department in 1882. In 1896 he founded and in 1897 became editor of the Imperial Press, in connection with which he directed from 1896 the publication of the Imperial library. He was for several years prominent in his activity for the preservation and extension of open spaces in and about London; and published: 'The "Romance" of Peasant Life' (1872); 'The Fern World' (1877; 10th ed. 1902); 'Our Woodland Trees' (1878); 'Where to Find Ferns' (1881), and other volumes.

Heath, Perry Sanford, American journalist and politician: b. Muncie, Ind., 31 Aug. 1857. He learned the printer's trade, in 1877 became a newspaper reporter, in 1878-80 was editor of the Muncie *Times*, and in 1881 established the *Pioneer* at Aberdeen, S. D. In 1881-93 he was a correspondent at Washington, D. C., in 1894-6 president and general-manager of the Cincinnati *Commercial-Gazette* (now the *Commercial-Tribune*), and in 1897-1900 was first assistant postmaster-general of the United States. In 1900 he was elected secretary of the Republican National committee.

Heath, William, American soldier: b. Roxbury, Mass., 7 March 1737; d. there 24 Jan. 1814. When the Massachusetts congress in 1774 voted to enroll 12,000 minute men, volunteers from among the militia, Heath, then a farmer in Roxbury, was commissioned as one of the generals. In June 1775 he received the appointment of brigadier in the Continental army, and in August 1776 was created major-general. When the troops moved to New York Heath was stationed in the highlands near King's Bridge, with orders to throw up fortifications for the defense of that important pass. In 1777 he was transferred to Boston, and the prisoners of Saratoga were entrusted to him. In June 1779 he was again in New York, at the Highlands, with four regiments, and was stationed near the Hudson till the close of the war. He was the last surviving major-general of the war. Consult: 'Memoirs of Maj.-Gen. Heath, con-

taining Anecdotes, Details of Skirmishes, Battles, etc., during the American War' (1798).

Heathcock, Heath-hen. See BLACKCOCK.

Heath'cote, Caleb, American merchant: b. Chesterfield, Derbyshire, England, 6 March 1665; d. New York 28 Feb. 1721. He was successful in a mercantile career in New York from 1692, save for the years 1698-1701, was a councillor of the province, was a petitioner for a license to build Old Trinity, was mayor of New York in 1711-14, and held other posts, among them those of judge of Westchester County; commander-in-chief of the military of the colony; surveyor-general; and receiver-general of customs for North America. His letters and despatches afford interesting glimpses of the history of his time.

Heaths, or Heather, a group (*Ericoideæ*) of the order *Ericaceæ*. The leaves of the heaths are simple and entire; their flowers oval, cylindrical, or even swelled at the base; the anthers of many with horn-like appendages. From 400 to 500 species are known, 12 or 15 of which inhabit Europe, and have small flowers, while all the remainder are natives of South Africa, many of them bearing brilliantly colored flowers, and forming one of the most characteristic genera of that region of dry plains. The common heath of Europe (*Calluna vulgaris*), a low shrub, often covers exclusively extensive tracts of dry land, and is used in domestic economy; mixed with oak-bark it is employed in tanning; and also, when tender, for fodder. This species forms the "heather" of British moorlands; but in Scotland are two other species, whose flowers are the "heather-bells" of Scottish song and story. Many South African species, remarkable for the size and beauty of their flowers, are much cultivated in greenhouses, and have been so improved and hybridized that they exhibit a wonderful richness of color.

Heating and Ventilation. Generally speaking, the methods of heating buildings may be divided into two general classes—the direct and the indirect system, or a combination of the two. Heating by means of an open fire, by a stove, and by radiators placed in the rooms to be warmed are examples of the former method, while furnace-heating and heating by means of a current of air warmed by indirect steam or hot-water coils are examples of the latter method. When a direct radiator is fitted with a connection to the outer air, it is said to be arranged on the direct-indirect principle. Hot water, steam, or electricity may be the vehicle used for conveying heat to radiators. Ventilation is only obtained by supplying air, and in some systems of heating and ventilation the air is made so hot that part of it is available for heating purposes. This is the case in furnace-heating.

It is well known that when two bodies of different temperature exist, heat passes from the warmer to the cooler body until their temperatures are equal. If a building be of a temperature of 70° F. and the outer air of a lower temperature, heat will be transmitted by the walls, windows, and other exposed surfaces, and the temperature of the air in the building will be lowered. It is only by supplying to the building an amount of heat equivalent to that transmitted by the walls and windows that it is possible to maintain the building at constant temperature. If we supply more heat than is

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transmitted by the walls, the temperature of the room rises.

Heat is measured in units which have as exact a value as a ton of coal or a pound of sugar. British physicists have selected as the unit of heat that quantity which will raise the temperature of one pound of water one degree on the Fahrenheit scale when the water's temperature is near 39° F. This unit is designated as the British thermal unit. It is known with reasonable accuracy just how many heat-units are transmitted by each square foot of wall, window, and other exposed surfaces of the various materials used in building construction, under such extreme conditions as to building and outside temperature as may exist. With these data and the plans of a building, calculation will show the heat-loss from a building or a room, and the heating-apparatus should be proportioned to supply this amount of heat. Allowances are made for various conditions that may exist, depending upon the judgment and experience of the designer. The heat required can be supplied by radiation from an open fire or from a stove, but this is an unsatisfactory method. Direct radiators supplied with steam or hot water can be placed in a room to furnish the heat necessary, or the heat may be supplied by hot air from a furnace, or by air heated by indirect radiators supplied with steam or hot water.

Heating by hot air is a slightly more expensive method than heating by direct radiation, for to be effective the air must be taken in from outdoors, sometimes at very low temperature, and heated above the temperature of the room to be warmed. If cold air at 40° F. is heated to 100° F., and is supplied to a room at this temperature, it is evident that as soon as this air is cooled from 100° to 70° no more heat can pass from the air to the room if the temperature of the latter remains at 70° . Under these conditions only one-half of the heat that has been supplied to the air is available for heating the room. This will tend to show why heating by hot air is more expensive, estimated from the cost of fuel, than the direct system. When the advantages of the air supply that accompanies indirect heating are taken into account the increased fuel cost becomes insignificant.

Direct heating is usually obtained by steam and hot-water radiators. Although manufacturers have greatly improved the appearance of direct radiators, at best they are unsightly and objectionable from an artistic point of view. This objection may be overcome by concealing the radiators in boxing beneath windows, when the walls of the building are thick enough to permit the boxing to be built in without projecting into the room. A screened opening is provided in the front of the boxing near the floor, and one at the top over the radiator, to permit a circulation of air, so that the radiators can be effective.

In residence-heating it is frequently the custom to heat the first floor by the indirect method and the upper stories by the direct. When an owner will pay for it, the indirect method is used throughout the building. Such a system is much to be preferred to the direct.

The simplest method of connecting steam-radiators is by the gravity system, and it is usu-

ally employed unless steam exhausted by engines is available for heating. This system comprises distributing-mains connecting with the top of the boiler, and with vertical riser-pipes from which horizontal branches lead to the radiators. Usually a return pipe is connected to the opposite end of the radiators from that at which steam is admitted, this return connecting, through return risers and mains, with the boiler at a point below the water-line. As the steam in the radiators condenses, the resulting condensation flows back by gravity through the return pipes to the boiler. The flow and return pipes are made sufficiently large to insure a practically uniform pressure throughout the system. The system is simplicity itself, as the fire only needs attention. When the boiler is once filled, no more water is required.

It is only recently that the steam exhausted by engines and pumps has been used for heating. Before this time steam direct from the boilers was used in direct radiators for heating mills and factories. The radiators consisted of coils of pipe suspended from the walls or ceilings. Sometimes the condensation was returned to the boilers by a pump or other device; sometimes it was allowed to go to waste. As the steam exhausted by engines, pumps, etc., contains a very large percentage of the heat that it contained upon entering the engine, someone conceived the idea of utilizing this steam for heating buildings, thereby saving the steam direct from the boilers that would otherwise have to be used. This practice is now almost universal where exhaust-steam is available, and the saving that it has occasioned is very great. By placing what is known as a back-pressure valve in the exhaust-pipe, sufficient pressure is maintained to cause the exhaust-steam to circulate through the pipes and radiators of the heating-system, the latter being connected to the exhaust-pipe between the engine and the back-pressure valve. The condensation that occurs in the heating system can be collected and returned to the boilers by various methods. Usually a pump or similarly acting device is employed.

A hot-water system arranged on the gravity-principle has flow and return pipes similar to the gravity-system of steam-heating described. The entire system is filled with water. As the water is warmed in the boilers it becomes lighter in weight per cubic foot, making a difference in pressure between the flow and return pipes and causing a circulation to begin. The water rises in the flow pipes to the radiators and is there cooled. On its return to the boiler the water is again heated, and so the circulation is maintained. As the difference in weight between the water in the flow and return pipes is very slight, the motive power producing the circulation is very slight also. Hence the pipes have to be relatively larger than for steam-heating and very carefully connected to avoid excessive friction, which would stop or retard the circulation. As large pipes are costly, in some large plants heated by hot water, a circulation is brought about by pumps.

Direct steam-radiators emit about 250 British thermal units per square foot of radiating surface per hour, and hot-water radiators about 180 heat-units per square foot. Consequently about one third more radiating surface is neces-

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sary with hot water than with steam. The pipes also must be larger, hence the hot-water system is the most expensive in first cost. Hot water, however, is cheaper to operate, for water will circulate with a very low fire and supply the small amount of heat required to warm a building in mild weather.

With direct steam-heat, operating on the gravity-system, it is impossible to vary to any appreciable extent the temperature of steam in a radiator; hence with this system the alternative is, all the heat the radiator will supply or none at all. This is the principal objection to heating by means of direct steam. Air warmed by the relatively cooler hot-water radiators is thought by some to be more agreeable than air heated by steam-radiators.

With indirect heating the lack of means of regulating the steam-temperature is not of so much moment, for the air-supply can be partly shut off by partly closing a register in mild weather; or else, if the full air-supply is required at all times, arrangements can be made for passing part of the air-supply around the indirect radiators, which is called "by-passing" them. Another method is to divide the indirect radiator into independent sections and place some of the sections under the control of a regulator that automatically shuts off the supply of steam when the room becomes too warm. The method of "by-passing" the radiator, or subdividing it, is used mainly with the fan-system of supplying air.

The cost of indirect hot-water heating is greater than that of indirect heating by steam, as the radiators and pipes must be larger, the same as in direct heating. Hot water is, however, cheaper to operate. The principal objection to its use in indirect heating is the possibility of damage to the indirect radiators through the freezing of the water in them in severe weather, if the circulation should from any cause be arrested.

The direct-indirect system consists of direct radiators connected with the outer air by means of an opening in the building-walls beneath the window-sill, the radiator being set under the window opposite the opening. With this system there is always the possibility of getting too much air when the wind blows strongly. Furthermore, in situations where the air is smoke-laden or dusty, it is not easy to keep the smoke and dust from entering a building supplied with air by this means.

As has been said, a supply of air may be brought about by the gravity-method or by means of fans. In the gravity-method the heated column of air in the flue is lighter than the outdoor air; hence it rises. As in the case of hot-water heating, the motive power is very slight, and it becomes less as the outdoor temperature increases. For this reason the gravity system is not a positive one, and it cannot be depended upon to supply much air in mild weather. Its use for schoolhouse ventilation is therefore to be deprecated. An important advantage of this system is its simplicity, as no machinery is required with it.

With the fan-system some type of fan is employed, to give a positive supply of air. The air is blown over coils, usually steam, and delivered to the room at a temperature slightly above that of the room, if the air-supply is in-

tended to ventilate only, or at a higher temperature if the air-supply is to carry with it the heat necessary to balance that transmitted by the walls and windows. In the former event the indirect coils act as tempering-coils, being sufficient only to raise the air to about 70° F. If the air-supply is to furnish heat for warming the rooms, additional coils, known as supplementary coils, are provided. These raise the air-temperature from 70° to from 100° to 120° F. Sometimes the supplementary coils are combined with the tempering coils, the whole being divided into several independently controlled sections. In some instances the supplementary coils are divided into a number of small coils, one being placed at the base of each air-supply flue, and so arranged that, by adjusting dampers controlled by hand or automatically, the temperature of the air supplied to any room can be regulated independently of that supplied to other rooms. If all of the air is passed through one group of coils, independent regulation of the temperature of the air in the branch ducts and flues is impossible. This independent regulation can be obtained, however, by the double-duct system. The coils are divided into two groups, one for tempering and one for supplying additional heat. All of the air is passed through the tempering coils, but only part of it through the supplementary coils, the balance "by-passing" the latter coils and flowing through a system of ducts, usually located below the system conveying the air of higher temperature, to the base of the flues. At the junction of the two ducts a mixing-damper is provided, so arranged as to open in one duct as it closes in the other. By adjusting this damper the air can be mixed to give the resultant temperature required.

In situations where direct radiators can be used, either exposed or concealed, it is becoming the practice to provide sufficient heat by means of direct radiation to balance the heat transmitted by walls, windows, etc., also a supply of tempered air for ventilation only. As previously explained, when heat is supplied by means of air, the fuel-cost is greater than with direct heating; so that a building can be warmed with less coal with the direct than with the indirect system. Furthermore, with the combined system, heating can be done at night, and at other times when air-supply is not required, at minimum cost. This system is particularly adapted for schoolhouse heating and ventilation.

The withdrawal of impure air from rooms is effected by fans connected to a system of vent-flues extending upward to an attic space, or downward to a cellar or basement, if the latter is more convenient. Another method of accelerating the outflow of air through flues rising to the roof of a building is by the use of aspirating coils. These are simply coils of pipe, or radiators, placed in the vent-flues as low down as possible, the coil heating the air and thus causing it to rise. Theoretically the aspirating-coil is a more expensive method of moving air than the mechanical method, as far as fuel-cost is concerned. It is simpler, however, than the fan-system.

Fans are of two general types—the disk or propeller fan, and the centrifugal blower. The former is constructed somewhat like a ship's propeller, and the current of air that it produces is mainly in a direction parallel with the shaft of the fan. The centrifugal blower, as usually de-

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signed, consists of a wheel with blades, something like a ship's paddle-wheel, enclosed in a casing. The air enters at the axis of the fan, and when the fan-wheel is revolved the air is discharged radially to the casing by the action of centrifugal force. Relatively speaking, the propeller-fan will move a large volume of air with small expenditure of power, but the pressure at which it will deliver air is limited. The centrifugal fan will deliver air under a greater pressure and the power required is therefore greater. In some buildings, where the system is of ducts and flues, is long, and the cross-sections are comparatively small, to save space, quite a pressure is required to force the necessary amount of air through them. For such situations the centrifugal blower is best adapted. When the ducts are short and of ample area, it is best to use the propeller type of fan.

Fans are driven usually by small steam-engines or by electric motors. Sometimes gas-engines have been used with success. Where an engine is used, it is necessary for the boilers to operate under a sufficient pressure to drive the engine, or at least under a higher pressure than is commonly used with the gravity-system of connecting radiators. If the steam exhausted by the engine is condensed in the heating-system, as it usually is, a pump is necessary to return the condensation to the boilers. In large office buildings, public buildings, theatres, etc., where a skilled engineman is employed to care for the plant, the use of a pump, an engine, etc., does not present an objection. On the other hand, in the case of schoolhouses, large residences, churches, etc., which are apt to be looked after by less skilled attendants, an engine, pump, and other apparatus that must go with them are open to objection. In such cases electric motors can be used if current can be obtained from an electric-supply company. The entire heating system can then be operated on the simpler gravity-system. Of course the current must be paid for, but in many locations its cost will be more than offset by the greater simplicity of the motor-driven system.

Heating by electricity is not done to any great extent, on account of the excessive cost. When coal is burned under a steam-boiler, it is not uncommon for 60 per cent of the heat in the fuel to be realized in the steam which can be used for heating. If the heat in coal be transformed into electrical energy, and this again transformed into heat, less than 10 per cent of the heat in the fuel will be realized for heating.

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HENRY C. MEYER, JR.,
Consulting Engineer.

Heaton, Augustus George, American artist: b. Philadelphia, Pa., 28 April 1844. He was the first pupil from the United States to study at the Paris Beaux-Arts, where he was

trained by Cabanel. Later (1878-80) he was in the studio of Léon Bonnat, and exhibited considerably at the Salon. Among his paintings are: 'Washington at Fort Duquesne'; 'The Recall of Columbus,' engraved on the 50-cent Columbian Exposition stamp of 1893; a portrait of Bishop Bowman; and 'Hardships of Emigration,' engraved on the 10-cent Omaha Fair stamp. He wrote 'The Heart of David—the Psalmist King' (1900).

Heaton, John Henniker, English publicist: b. Rochester, Kent, England, 1848. He was for some time prominent in Australian journalism and has sat in the House of Commons for Canterbury from 1885. He carried the Imperial Penny Postage Scheme in July 1898, introduced telegraph money orders into England, the parcel-post to France, and has been connected with other progressive schemes. He has published: 'Manners and Customs of the Aborigines of Australia'; 'Australian Men of the Time'; etc.

Heaton, John Langdon, American journalist: b. Canton, N. Y., 29 Jan. 1860. He was graduated from St. Lawrence University in 1880, entered journalism as a member of the Brooklyn Times staff in 1881, and in 1897 became assistant editor of the New York World. His publications are: 'The Story of Vermont' (1889); 'Stories of Napoleon' (1895); 'The Book of Lies' (1896); 'The Quilting Bee' (1896).

Heaven, in a physical sense, is the azure vault which spreads above us like a hollow hemisphere, and appears to rest on the limits of the horizon. Modern astronomy has taught that this blue vault is, in fact, the immeasurable space in which earth, sun, and planets, with the countless host of fixed stars, revolve. The blue color of the heavens is due to the action of minute particles in the air upon the blue rays in sunlight.

In ancient astronomy, heaven denoted a sphere or circular region of the ethereal heaven. The ancient astronomers assumed as many different heavens as they observed different celestial motions. These they supposed to be all solid, thinking they could not otherwise sustain the bodies fixed in them; and spherical, that being the most proper form for motion. Thus they had seven heavens for the seven planets: the moon, Mercury, Venus, the sun, Mars, Jupiter, and Saturn. The eighth was that of the fixed stars, which was particularly denominated the firmament. Ptolemy adds a ninth heaven, which he calls the *primum mobile*. But others admitted many more heavens, according as their different views and hypotheses required: Eudoxus supposed 23; Regiomontanus 33; and Fracastoro no less than 70.

In theology, this word denotes the upper and nobler region of God's universe, in contrast with the earth, the lower part assigned to men for their habitation. Of the belief in the existence of some special scene of the presence of Deity, the majority of the known religions of the world bear ample evidence. According to Aristotle all men, whether Greeks or barbarians, had a conception of God; and all united in placing the residence of the gods in the most elevated regions of the universe. This idea runs through the Persian, Egyptian, German, Scandinavian, and indeed of all the ancient religions

in which the belief in a supreme being assumes any other form than the pantheistic; and even though the pantheistic philosophers may have denied that any peculiar locality could be regarded as the peculiar habitation of the Deity, we find that the popular belief and worship of the sect is evidently grounded upon a contrary opinion. In addition, however, to its being the special seat of the Deity, heaven also denotes the place, or the state or condition of blessed spirits, and of the souls of just men either immediately after physical death or at some certain period subsequent to it. All the religious systems which include the immortality of the soul involve, at least in substance, the idea of a future state of happiness as a reward for a virtuous life. The delights of the heavens of the various creeds differ greatly in kind. The pleasures of the classical Elysian fields were to a great extent pleasures of sense; the German warrior believed he would be transferred to a region where he would be able to pursue his old fierce enjoyments, and the American Indian cherishes the notion that he quits this world for a happier hunting-ground. Among Christians the general opinion is that heaven is the residence of the Most High, the holy angels, and the spirits of just men made perfect, that this abode is eternal, its joys entirely spiritual; it is believed also by many that the just who are free from sin are admitted into heaven immediately after death; also that the souls of the patriarchs, prophets, and in general the good, were detained, before the new dispensation, in a temporary abode till the coming of the Redeemer. See IMMORTALITY.

Heaves, or **Broken Wind**, a disease of the horse generally described as unsoundness of the respiratory organs. The disease is not well understood by veterinarians and the treatment is unsatisfactory. It is generally conceded that the disease is incurable. The characteristic symptoms are labored breathing, dilated nostrils, bloodshot eyes and dependent belly. Horses with this disease often drop down while at work and succumb to congestion of the lungs, hemorrhage or suffocation, the direct result of the heaves. Upon post-mortem examination the stomach is found distended and to have thinner walls than in the normal horse.

Hebe, *hē'bē*, according to Greek mythology, the goddess of youth, and the cup-bearer on Olympus until replaced by Ganymede. She was a daughter of Zeus and Hera, who gave her as a wife to Heracles, in reward of his achievements. At Rome she was worshipped as *Juventas*. She is described by some authorities as a divinity who had it in her power to make old persons young again. In the arts she is represented with the cup in which she presents the nectar, under the figure of a charming young girl, her dress adorned with roses, and wearing a wreath of flowers. An eagle often stands beside her, which she is caressing.

Heber, *hē'bēr*, **Reginald**, English Anglican bishop and poet: b. Malpas, Cheshire, 21 April 1783; d. Trichinopoly, India, 1 April 1826. He was educated at Brasenose College, Oxford, distinguished himself by the English prize poem—'Palestine,' was elected to a fellowship in All Souls' College, traveled in Germany, Russia, and the Crimea, entered holy orders in

1807, and became the incumbent of Hodnet, Shropshire. In 1812 he was appointed prebendary of St. Asaph, in 1815 Bampton lecturer at Oxford, in 1822 preacher at Lincoln's Inn. From 1822 until his death he was bishop of Calcutta, at that time constituting one very extensive diocese, in all parts of which he traveled to the furtherance of the mission work in progress. He completed the establishment of Bishop's College, Calcutta, begun by Bishop Middleton. Heber is best known for his hymns, 58 of which, including the familiar 'From Greenland's Icy Mountains,' 'Brightest and Best,' and 'Holy, Holy, Holy!' appear in 'Hymns Written and Adapted to the Weekly Church Service of the Year.' In prose he wrote 'A Life of Bishop Jeremy Taylor' (1822), and 'A Journey Through India' (1828). Consult the 'Life' by Smith (1895).

Hébert, **Jacques René**, *zhāk rê-nā ā-bār*, French journalist and politician: b. Alençon, Orne, 15 Nov. 1755; d. Paris 24 March 1794. At the beginning of the French Revolution Le-maire published a journal supporting constitutional principles under the title 'Père Duchesne.' The Jacobins soon established a rival 'Père Duchesne,' of which Hébert became editor. The journal owed its success to the cynical virulence with which it advocated the popular cause, and abused the court and the monarchy, and soon had the field to itself. He was a member of the Revolutionary Commune that approved the massacres in the prisons in September 1792, was soon after substitute attorney of the commune, and employed all his influence in forwarding a project to establish the authority of the commune on the ruins of the national representation. The Girondists, who were at that period contending against the Mountain, had credit enough to procure the arrest of Hébert 24 May 1793. Again restored to liberty, he assisted with all his power and influence in the proscription of the Brissotins. Their downfall hastened his own. With Chaumette he established the 'Feast of Reason,' and afterward accused Danton of having violated the nature of liberty and the rights of mankind. This terrified both Danton and Robespierre, who suspended their mutual jealousies to accomplish his destruction; and Hébert, with the greater part of his associates, was arrested and guillotined.

Hébert, **Louis Philippe**, Canadian sculptor: b. Sainte Sophie d'Halifax, Quebec, 27 Jan. 1850. He studied for several years in Canada, and later in Paris, where he established his studio. In 1894 he won the Confederation medal awarded by the Canadian government. Among his works are historical subjects executed for public buildings in Quebec, Ottawa, and Montreal.

Hebrew Language and Literature, the tongue in which the ancient Jews spoke and wrote, and the books produced by that people during their settlement in Palestine as an independent nation; these latter constitute the Hebrew Scriptures and are looked upon by the Hebrews as containing the inspired word of God. See JUDAISM—HEBREW LANGUAGE; JEWISH LITERATURE; JEWISH PHILOSOPHICAL WRITERS; THE JEW IN ART, SCIENCE, AND LITERATURE; THE TALMUD; THE MASORAH; THE CABALA.

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Hebrews. See **Jews in America**; **Jewish Sects**; **Jewish Charities**; **Judaism—Its Principles**; **Jewish History**; **Reformed Judaism**; **Zionism**; **Anti-Semitism**; **The Karaites**; **Status of the Jew throughout the World**; **Rabbinic Legislation**; **Jewish Emancipation**.

Hebrews, one of the canonical books of the New Testament, usually spoken of as "The Epistle to the Hebrews." The fact that it lacks the introductory formula naming author and recipients, to be expected in every ancient letter, has led some to deny that this writing is a letter. But this form may in this case, as often, have been placed on a separate sheet and become lost, or for some other reason have failed to be copied. At any rate many expressions show that it really was a letter addressed by some individual to a definite group of early Christians. In the King James version it was styled "The Epistle of Paul the Apostle," and thus has been perpetuated an early Alexandrian tradition, which later became the universal opinion for many centuries. But this view was at first unknown in Rome and the West, where are the earliest traces of the use of this writing, and it differs from the acknowledged epistles of Paul in both style and thought. The language is here more idiomatic and choice; clauses and sentences are connected by an array of conjunctions largely different from those used by Paul; instead of his abrupt, almost disconnected course of expression, earnest to vehemence, we find in **Hebrews** a series of balanced periods, flowing smoothly even when most emphatic, and a style abounding in almost artificial devices of rhetoric. There is no less difference in the theological conceptions and their presentation. While not antagonistic to Paul's doctrines, being rather complementary, the doctrinal teachings here are yet variant, as, for example, the teachings as to the divine Sonship of Christ; the nature of faith, and the value of the law of Moses.

While the Pauline authorship is now set aside as out of the question by the practically unanimous judgment of critics of every school, there is no general agreement as to who did write the book. Clement of Rome and Luke have been urged for no reasons except valueless suggestions made by Clement of Alexandria and his pupil Origen. Harnack has conjectured that it may have been written by Priscilla in association with her husband Aquila, but this view can satisfy only such as regard it as addressed to Roman Christians. The conjecture of Luther that Apollos was the author has been widely accepted, while the later suggestion that it was written by Barnabas has met with the approval of many scholars of the highest rank. The latter view has in its favor, to be sure, the only ancient testimony of real weight, that of Tertullian, but it must be allowed that either Barnabas or Apollos would meet all the requirements of the case so far as they are now known, and consequently that the authorship cannot be positively decided.

There is no less uncertainty in naming the persons to whom it was originally addressed. The title prefixed very early, though in all probability not originally, was "To Hebrews," and the view that it was addressed to Jewish Christians is nearly universal. Not a few scholars, however, have lately declared in favor of the view

that it was written rather to Gentile Christians. The decision hinges on the answer to the question whether the danger against which the author warns his readers is relapse into heathenism or relapse into Judaism. On the one side it is urged that relapse into Judaism could not properly be designated "apostasy from the living God," while on the other side it is urged that, while Judaism was in the author's mind good as compared with heathenism, yet its acceptance at cost of a surrender of all that was distinctively Christian might reasonably be styled apostasy. It has certainly seemed to most that the fact that the whole thought of the book is the superiority of Christianity over Judaism proves that the danger against which the first readers were warned was relapse into what the author regarded as relatively worthless because an outgrown and outworn stage of divine revelation, and that the opinion that apostasy into heathenism was the readers' danger is only "an ingenious paradox," even though "an amount of ingenuity has been expended in support of this hypothesis, sufficient to render it plausible."

To some extent the questions as to place and date depend for their answer upon the conclusion as to the character of the first readers. If addressed to Hebrew Christians, it is scarcely possible that its date can be later than 68, just before the Jewish war which resulted in the destruction of Jerusalem, and the final removal of the danger of relapse into Judaism, while the fact that it is addressed to a second generation of believers and the references to the lapse of considerable time make it necessary to set the date as late as possible. If addressed to Gentile Christians, it might be dated as late as 85 or even 90. But that in any case it is a first-century production is guaranteed by the use made of it by Clement of Rome before the year 100.

Where the first readers are to be looked for hangs as completely on their character as does the question of date. If Gentile, most would think it probable that they were to be found at Rome, where they may have constituted only a single group of many among the Christians in the city. If, however, they were really Hebrews, it is, if not impossible, at any rate less likely that they were at Rome. The reference to "those from Italy" is ambiguous, but it would seem plausible that Timothy had been imprisoned at Rome rather than that on release he should hasten hither. If the core of the book is a warning against Judaism, it would be natural to look for those needing such a warning nearer the Temple than was Rome. While it is generally regarded as improbable that the letter was addressed to the church at Jerusalem, there may have been many communities within easy reach of that city where such a group of Christians as these "Hebrews" could have been found. Syrian Antioch and Jamnia have been named among other places.

The author very fitly styled his work "a message of appeal." Such it is throughout. To be sure, the first ten chapters consist largely of argument skillfully marshaled and stated, but all is to strengthen appeal, and exhortation is constantly inwoven with demonstration. The great theme is the superiority of Christianity over Judaism. While this is developed in many phases, it may be briefly summed up in saying that in chapters i-vi the stress is laid on the

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personal superiority of Christ, as compared with angels, Moses, Aaron, and then (vii. 1-x. 18) the superiority of the work of Christ is set forth. But the whole is one plea for persistence in the Christian profession and life, and while the changes of the centuries have made much in this book peculiarly hard to understand and have robbed other arguments of some of their original force, yet, when understood, this plea for the value of Christianity remains cogent as well as earnest.

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Hebrides, hēb'ri-dēz, **The, or Western Islands**, Scotland, an archipelago off the west coast, extending from lat. 55° 35' to 58° 32' N.; the most southern island being Islay, and the most northern, Lewis. The group is politically divided between the shires of Ross and Cromarty, Inverness, and Argyll, very nearly in the line of their coincidence with the coasts of the respective counties. They number about 400 in all, but many are inconsiderable islets and rocks, and only about 90 are inhabited; area, about 2,800 square miles; pop. (1901) 79,159. They are usually divided into the Outer Hebrides, of which the principal are Lewis and Harris (forming a single island), North Uist, Benbecula, South Uist, and Barra; and the Inner Hebrides — Skye, Mull, Islay, Jura, Coll, Rum, Tiree, Colonsay, etc. The Outer are separated from the Inner, and from the mainland, by a strait or channel called the Minch, which at its narrowest part, between Harris and Skye, is about 12 miles broad.

The climate is mild and salubrious, but variable, tempestuous, and humid. Snow and frost are almost unknown in the smaller islands, and are but little felt in the larger. There is comparatively little wood in the Hebrides, and on many of the islands none at all. In Lewis, Skye, Islay, Mull, and several of the other islands, however, both forest and fruit trees have been planted to a considerable extent, with great success. Oats and barley are almost the only cereal crops raised. Potatoes are extensively cultivated. Cattle constitute the staple product. The native breed are small but handsome. Cheese and butter of good quality are produced. The breed of horses is also small, but hardy and docile. The native breed of sheep is very small, but Cheviots have been introduced with success. The productive land is partly occupied as sheep-farms; much of it is held by "crofters," who occupy holdings usually of a very few acres, sometimes with a right of pasturage in common attached. There are also "cotters" who occupy houses, with or without a patch of ground, on the land of the crofter, the farmer, or the landlord, and who are often mere squatters paying no rent. Grouse-moors and deer ranges cover a considerable area. Owing to the minute division of the arable land there is in many places an excess of population. The condition of the crofters and cotters, especially in the Outer Hebrides and Skye, is very depressed, their dwellings miserable, and their living poor, consisting chiefly of potatoes, milk, and oat or barley bread, and in bad harvests it is often insufficient in quantity. The fisheries are not developed to the extent they might be. Whiskey is manufactured in Skye, Islay, and Mull. Gaelic is the universal language of the

Hebrides, which in remote times were subject to the kings of Norway, but in 1264 were annexed to the crown of Scotland. They were held by various native chieftains, in vassalage to the Scottish monarch; but subsequently fell into the hands of one powerful chief, who thereupon (1346) assumed the title of "Lord of the Isles," and began to affect an entire independence of his sovereign. The abolition of hereditary jurisdictions in 1748 secured to these islands for the first time the peace and safety afforded by a just and powerful government. Little was known about the Hebrides until the publication of Johnson's 'Journey to the Western Islands of Scotland' (1775), and of Scott's 'Lord of the Isles,' which invested them with a popular interest which has been increased by the facilities afforded to tourists by the steamers of the Clyde.

Hebron, hē'brōn (originally KIRJATH ARBA, now EL-KHALIL), Asiatic Turkey, a town of great antiquity in Palestine, 18 miles southwest of Jerusalem, 2,830 feet above sea-level. It lies in the narrow valley of Mamre, has narrow streets, high well-built stone houses with flat roofs, extensive covered bazars, with well-furnished shops, exhibiting glass manufactures, consisting of lamps, colored rings, etc., for which the place has long been celebrated. The chief mosque, El-Haram, built around the Cave of Machpelah, from which Christians are rigorously excluded, is esteemed by Mohammedans one of their holiest places. Hebron is one of the oldest existing towns, having been built seven years before Zoan (Num. xiii. 22), and it is mentioned prior to Damascus (Gen. xiii. 18). Abraham resided here, and acquired the Cave of Machpelah as a sepulchre for Sarah and his family. It was David's royal city for seven years. There is a German Protestant mission here. Pop. about 19,000.

Hebron, Neb., city, county-seat of Thayer County; on the Little Blue River, and on the Chicago, R. I. & P., and the Burlington & M. R.R.'s; about 63 miles southwest of Lincoln. It is situated in an excellent agricultural and stock region. It has a large flour-mill, a creamery, and a planing-mill. There are five churches, a high school, three banks, and three weekly newspapers. The shipments of wheat and live stock are extensive. Pop. (1910) 1,778.

Hecataeus, hek-ā-tē'ūs, distinguished Greek historian and geographer: fl. about 500 B.C. He was a native of Miletus, and the son of Hegesander, a member of an ancient and illustrious family. Of his public life the only event of which we have any definite knowledge was the part he took in the insurrection of the Ionians against the Persians. Being well acquainted with the resources of Persia, he vainly attempted to dissuade Aristagoras, the planner of the revolt, from his undertaking. Later he went as ambassador to Artaphernes, and prevailed on the satrap to win the confidence of the Ionians by lenient treatment. His two great works were his 'Tour of the World,' and his 'Genealogies.' The latter is little more than a prose version of the legends already given in versified form. He improved the map of the world made by Anaximander; and his writings were highly esteemed by Herodotus. The fragments of his works were published by Müller (1841-70).

Hecate, hēk'ā-tē, in Greek mythology, a goddess, whose parentage is variously given.

Homer does not mention her. She appears to have been originally a Titan who ruled in heaven, on the earth, and in the sea. She could bestow or withhold at pleasure the blessings of wealth, victory, and wisdom to mortals, and was the only Titan who retained power under the rule of Zeus. She was subsequently confounded with several other divinities, and at length became a mystic goddess having all the magic powers of nature at her command. She was identified with Demeter and Artemis, and was regarded as the mystic Persephone. Magicians and witches prayed particularly for her aid. Sacrifices used to be offered to her at places where three ways met (whence her epithet *Τριῶ δῖρα*, or in Latin, *Trivia*), and these consisted of dogs, honey, and black female lambs. Her mysterious festivals were celebrated annually at Ægina. Her appearance was frightful. She had three bodies or three heads, and serpents hung hissing around her neck and shoulders.

Heck, Barbara, one of the founders of American Methodism: b. Ballygarry, County Limerick, Ireland, 1734; d. near Augusta, Ont., 1804. She was one of a colony of German immigrants in Ireland who were among the first to be influenced by Wesley's preaching. In 1760 she came to America with her husband, Paul Heck, and Philip Embury (q.v.). In 1766 she was very active in the organizing of a Methodist society which met at Embury's house, and she also did much toward the building of the Old John Street Methodist Church. Later she and her family removed to the northern part of New York State, and when the Revolution broke out went to Ontario, where they founded another Methodist society.

Heck'er, Friedrich Karl Franz, German-American soldier: b. Eichtersheim, Baden, 28 Sept. 1811; d. St. Louis, Mo., 24 March 1881. After studying law in Heidelberg, he abandoned his profession for political life. In 1842 he was elected to the Chamber of Deputies of Baden. On the outbreak of the revolution in Germany in 1848 he endeavored to convert the preliminary convention into a permanent republican assembly. Frustrated in this attempt, he put himself at the head of a band of revolutionists, and invaded Baden from the south. He was defeated at Käduren 20 May 1848, and fled to Switzerland. In the following year he removed to the United States, and became a farmer near Belleville, Ill. On the outbreak of the Civil War he raised a regiment of Germans, serving in General Fremont's division as colonel; and afterward for a time commanded a brigade.

Hecker, Isaac Thomas, American Roman Catholic clergyman: b. New York 18 Dec. 1819; d. there 22 Dec. 1888. In early life he was a member of the Brook Farm community, near Boston, where for nearly a year he officiated as baker for the establishment. In 1845 he became a Roman Catholic; went to Germany to study for the priesthood, and joined the Redemptorist Fathers in Belgium in 1847. He was ordained priest in London by Cardinal Wiseman in 1849. Returning to New York he founded the order of the Paulists (1858), became their superior; and established the 'Catholic World' (1865), of which he was editor till his death. An anonymous French version of Elliott's 'Life of Father Hecker' led to the noted 'American' controversy. He wrote: 'Questions of

the Soul' (1855); 'The Church and the Age' (1888); etc. Consult: Sedgwick, 'Father Hecker' (1900).

Heckewelder, hēk'ē-wēl-dēr, John Gottlieb Ernest, American Moravian missionary: b. Bedford, England, 12 March 1743; d. Bethlehem, Pa., 21 Jan. 1823. At the age of 12 he came with his father to Pennsylvania. He accompanied Post in 1762 in his expedition to the Indian tribes on the Ohio, and in 1771 took up his residence among them as a missionary. After some 40 years' missionary service, he went to Bethlehem, the principal establishment of the Moravians in America, and there remained till his death. He wrote several memoirs upon the Delaware and Mohegan Indians: 'Account of the History, etc., of the Indian Nations' (1818); 'Narrative of the Mission of the United Brethren' (1820).

Hec'la, or Hekla, Iceland, an isolated volcano in the southwest, about 20 miles from the coast. It is of comical shape, terminating in three perpetually snow-clad peaks, the central and loftiest of which, Heklufljall, is 5,110 feet high. The circumference at the base is about 12 miles. It is composed chiefly of columnar basalt, and of lava, mostly covered by stones, scoria, ashes, and other loose volcanic matter. Since the 10th century there are 43 eruptions on record. One of the most tremendous occurred in 1783, after which it remained quiescent till 2 Sept. 1845, when it again became active, and continued with little intermission for 15 months to discharge itself from three craters, its effects being felt as far as the Orkney Islands, 400 miles distant. The last outbreak was in 1878.

Hectic Fever, a type of fever which is intermittent, and is distinguished by an afternoon or evening quickening of the pulse, and rise of temperature. The eyes of the patient brighten, his cheeks flush, and there is some nervous and cerebral excitement. The fever is succeeded by a profuse perspiration. This affection is frequently associated with phthisis, abscess, or septicæmia, and is of dangerous significance.

Hector, in Homeric narrative, the son of Priam and Hecuba, and the bravest of the Trojans, whose forces he commanded. His wife was Andromache, the daughter of Aëtion. He encountered the Grecian heroes in battle, and often gained advantages over them. By his presence Troy was invincible; but when he had slain Patroclus, the friend of Achilles, the latter, forgetting his dispute with Agamemnon, resumed his arms to avenge the death of his beloved companion. Pierced by the spear of Achilles, the body of Hector was dragged at the chariot wheels of the conqueror; but afterward, at the command of Zeus, was delivered to Priam for a ransom, who gave it a solemn burial.

Hector, Annie French ('MRS. ALEXANDER'), Irish novelist: b. Dublin, Ireland, 1825; d. London 10 July 1902. She began to write at an early age and was a prolific and popular writer. Among her books, all of which enjoyed a wide popularity in the United States, are: 'The Wooing O't' (1873); 'Ralph Wilton's Weird' (1875); 'Her Dearest Foe' (1876); 'The Frères' (1882); 'A Golden Autumn' (1897); and 'A Winning Hazard' (1897).

Hec'uba, in Greek legend, the second wife of Priam, king of Troy, to whom she bore Hector, Paris, Cassandra, Troilus, and other children. After the fall of Troy she was given as a slave to Odysseus, and, according to one form of the legend, in despair leaped into the Hellespont.

Hed'ding, Elijah, American Methodist bishop: b. Dutchess County, N. Y., 7 Jan. 1780; d. Poughkeepsie, N. Y., 9 April 1852. At 19 he entered the Methodist ministry, and was appointed successor of Lorenzo Dow. He extended his travels to Canada, and preached the Gospel in various parts. He became a member of the New York annual conference in 1801, and was made a bishop in 1824. He was instrumental in the establishment of the 'Zion's Herald' at Boston, the first journal published by the Methodist Church in the United States.

Hedge, Frederick Henry, American scholar: b. Cambridge, Mass., 12 Dec. 1805; d. there 21 Aug. 1890. He studied in Germany 1815-23, was later graduated from Harvard and Harvard divinity school, and after holding Unitarian pastorates in Bangor, Maine; Providence, R. I., and Brookline, Mass.; was professor of German at Harvard University (1872-81). Deeply read in philosophy, ecclesiastical history, and German literature, he was a finished writer and a much admired orator, and ranked as perhaps the foremost German literary scholar in the United States. Among his writings are: 'Reason in Religion' (1865); 'The Primeval World of Hebrew Tradition' (1870); 'Martin Luther and Other Essays' (1888); etc. His 'Prose Writers of Germany' (1848) is a standard work. He translated poems from the German and wrote numerous hymns for the Unitarian Church.

Hedge, a fence formed of living trees or shrubs. Hedges are generally composed of one or more of the following species: Hawthorn, crab, blackthorn, holly, privet, beech, hornbeam, maple, barberry, furze, broom, alder, poplar, willow, yew, box, arbor-vitæ, sweet-briar, etc. When there are so many different species to select from, plants may be found suitable for almost all kinds of soil—such as wet or boggy, and dry or sandy; for all situations, whether sheltered or exposed; and for all purposes, such as fences against cattle, or simply as ornaments for garden and pleasure grounds.

Hedgehog, a small insectivorous mammal of the Old World family *Erinaceida*, and especially of the genus *Erinaceus*, characterized by its coat of stiff spines. The family inhabit temperate Europe and Asia, but are not known on sea-girt islands. The best known of the score of species is the common hedgehog (*E. europæus*). It has a long nose, the face, sides, and rump covered with strong, coarse, yellowish hair, the back with sharp, strong spines; and is about nine inches long plus a very short tail. Hedgehogs, as their name indicates, reside under hedges and in thickets, where they turn over the leaves and root in the mould for insects (especially beetles), snails, lizards, roots, fallen fruit, etc.; they are, indeed, omnivorous. The hedgehog defends itself against attack by rolling itself up, and thus exposing no part of its body that is not furnished with a defense of spines. It may be rendered domestic to a certain degree,

and has been employed in Europe to destroy cockroaches, which it pursues with avidity. In the winter, in cold climates, the hedgehog wraps itself in a warm nest, composed of moss, dried hay and leaves, and remains torpid till the return of spring. The female produces four or five young at a birth, which soon become covered with prickles. These animals are sometimes used as food, and are said to be very delicate. The long-eared hedgehog (*E. auritus*) of the East is smaller than the common, and is distinguished by the great size of its ears and shortness of tail. Fossil forms as far back as the Miocene differ little from existing species. No true hedgehogs exist in America; the animals often so called being the very different porcupines (q.v.).

Hedge-hyssop. See GRATIOLA.

Hedge-sparrow, a small brown warbler (*Accentor modularis*), with a sweet plaintive song, very common in Europe about gardens and roadsides in summer. It is not a sparrow at all, but nearly related to the American water-thrushes (*Seiurus*). In Great Britain it goes by many names, as dunnoek, etc., and is one of the birds most frequently mentioned in books.

Hedin, Sven Anders, svîn än'dêrz hî-dên', Swedish geographer and explorer: b. Stockholm 19 Feb. 1865; was educated at Stockholm, Upsala, Berlin, and Halle, at the latter university receiving the degree of doctor of philosophy. In 1885 he began his first journey of exploration through Persia and Mesopotamia. In 1890 he went to Persia as a member of King Oscar's embassy to the Shah, and the next year journeyed through Khorassan and Turkestan. In 1893 he set out on a remarkable journey from the Russian frontier to Peking, through Tibet and the Lob-nor region. He arrived at his destination in 1897, having experienced four years of exciting and harrowing adventures. His second expedition to Central Asia began in 1899. In 1901, writing from Narkhlik, Dr. Hedin tells of finding the ruins of a beautiful Buddhist temple, some rare specimens of wood carving and 12 complete letters written in Chinese on paper and marvellously well preserved. Dr. Hedin has written five books, four in English: 'A Journey Through Persia and Mesopotamia' (1887); 'King Oscar's Embassy to the Shah of Persia' (1891); 'A Journey Through Khorassan and Turkestan' (1892); and 'Through Asia' (1898). He wrote also a scientific treatise in German, 'The Results to Geographic Science of My Travels in Central Asia.'

Hedonism is the name applied to any system of ethics which regards pleasure or happiness as the chief good; as the good, that is, which makes all other goods desirable and to which they are all means. Not only money, health and the like are valuable merely as sources of happiness, but virtue itself has no better claim to independent worth. In fact, for most hedonists, virtue is the name given to that kind of action which long experience has shown to conduce to happiness. The most important of the many subdivisions of the theory is that which distinguishes psychological from ethical hedonism. According to the first, pleasure is the inevitable content of every choice. Even in those instances of self-sacrifice which seem the most radical contradiction of such a view,

the exception is apparent rather than real. For the martyr, death is preferable to denial. If it were not pleasant to him, he would not and could not choose it. Ethical hedonism, on the other hand, makes the choice of pleasure a duty rather than a fact. The two have sometimes been regarded as incompatible, on the ground that what necessarily regulates choice cannot be exalted into an ideal; but the frequent inclusion of both in the same system may have a partial justification in the necessity for the rejection of certain pleasures and the acceptance of certain pains, if the greatest possible happiness is to be attained in the end.

A second division of the forms of hedonism is that between individual and universal, and is based upon the number of persons whose happiness constitutes the good. Individualistic hedonism regards the happiness of the man concerned as his own chief good, while that of other people is either a matter of indifference to him, or else is of importance merely because it forms one of the elements of his own happiness. Evidently psychological hedonism is necessarily individualistic, although its combinations with ethical hedonism have often made it present an appearance of universality not strictly compatible with its original assumptions. Although there are plenty of modern instances of individual hedonism, these do not differ in essentials from the classical forms presented by the Cyrenaicism of Aristippus (cr. 435-356 B.C.) and the Epicureanism that sprang from it (Epicurus 342 or 341-270 B.C.). Both Aristippus and Epicurus taught that individual enjoyment was the supreme good, but they differed in their conception of the nature of enjoyment and of the means by which it was to be obtained. Aristippus advocated seizing the pleasure of the moment, untroubled by regret for the past or dread of the future. Epicurus, while he also preached against fear and regret, maintained that the object of desire was a happy life rather than a succession of pleasant moments, an organized whole, not a mere sum. Another distinction between the conception of the two is found in the nature of the pleasurable state as described by each. For Aristippus its chief characteristic was excitement; for Epicurus, tranquility; a difference that undoubtedly was largely responsible for the different means advocated by them. The later modifications of both theories show the well-known tendency of hedonism toward pessimism.

Universal hedonism was first brought markedly into notice by the Utilitarians, who found the supreme good, not in each man's own happiness, but in happiness in general, usually expressed by the formula "the greatest good of the greatest number." The moral worth of an action must be judged by the amount of happiness it will tend to bring about in the long run; and the consideration of all the different elements of intensity, length of time, certainty, possible complicating pain, and so forth, known as the hedonistic calculus, is associated with the name of Jeremy Bentham (1748-1832). John Stuart Mill (1806-1873), to whose clear and persuasive mode of statement the theory owes much of its popularity, added to it the distinction between quality and quantity in pleasure. With the exception of Mill, both ancient and modern hedonists have almost invariably re-

garded pleasures as differing from one another in quantity alone; he, on the contrary, maintained that their differences were primarily qualitative, and that quality must be considered in the conception of the chief good. An action is to be judged, not only from the amount, but from the kind of happiness it causes. Mill's view has met with much adverse criticism, based upon the contention that with qualitative differences in pleasure a non-hedonistic criterion has been introduced, which is inconsistent with the initial assumption of hedonism. The adoption of hedonism by the evolutionists, especially by Spencer, has given it a scientific basis, to which its present currency is partly due. Although the end in such systems is preservation, either of the individual or of the species, or of both, yet the actions best adapted to that end are accompanied by pleasure, and the animal to whom useful actions are painful, does not perform them and is in course of time eliminated. Actions found desirable in the history of the race come to have a feeling of obligation attached to them; and although at present end and means may to the individual consciousness seem incompatible, yet as man becomes better adapted to his environment, all virtuous, that is, useful actions will bring pleasure directly as well as indirectly.

As a theory of ultimate value hedonism can, of course, be neither proved nor disproved. Its chief advantages are: (1) It provides a simple and self-consistent account of moral action. (2) It makes possible a closer union between ethics and natural science than that allowed by any other theory, and is able to make use of the constantly growing store of knowledge in biology, anthropology, and ethnology. The most important objections brought against it are: (1) It confuses origin with value. (2) In regarding the moral end as constituted by feeling alone, it is psychologically inadequate, and psychologically false in so far as it views pleasure as the exclusive object of choice. See also ETHICS; UTILITARIANISM.

Bibliography.—W. Wallace, 'Epicureanism;' John Stuart Mill, 'Utilitarianism;' Herbert Spencer, 'The Principles of Ethics;' Henry Sidgwick, 'Methods of Ethics.'

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Heel-Fly. See BOT-FLY.

Heer, hār, Oswald, Swiss naturalist; b. Nieder-Utzwy, Switzerland, 31 Aug. 1809; d. in Lausanne, 27 Sept. 1883. He was educated at the University of Halle; entered the ministry in 1831; as privat docent in botany in the University of Zurich 1834-52 and from 1852 professor of botany at the University and at the Polytechnicum, and from 1835-83 was director of the botanical gardens at Zurich. His most important works were: 'Flora Tertiaria Helvetiae' (1854-6); 'Tertiary Climates in Their Relation to Vegetation' (1860); 'Die Urwelt der Schweiz' (1865-79); 'Flora Fossilis Helvetiae' (1877); and 'Flora Fossilis Arctica' (1865-83).

Heeren, hā'ren, Arnold Hermann Ludwig, German historian and philologist; b. Arbergen, near Bremen, 25 Oct. 1760; d. Göttingen, 6 March 1842. He was educated at the cathedral

school of Bremen and the University of Göttingen; in 1794 was appointed professor of philosophy and in 1801 professor of history at Göttingen. His chief works are: 'Ideen über Politik, den Verkehr und den Handel der vornehmsten Völker der alten Welt' (1793-6, 4th ed. 1824-6); 'Geschichte des Studiums der Klassischen Litteratur seit dem Wiederaufleben der Wissenschaften' (1797-1802); 'Handbuch der Geschichte der Staaten des Alterthums' (1828); 'Geschichte des europäischen Staatensystems und seiner Colonien' (4th ed. 1822); 'Versuch einer Entwicklung der Folgen der Kreuzzüge' (1808); and 'Vermischte historische Schriften' (1803-8).

Heermans, Forbes, American dramatist: b. Syracuse, N. Y., 25 Oct. 1856. He was graduated from Cornell University in 1878, and is author of the dramas: 'Love by Induction' (1889); 'The Silent Witness' (1890); 'Between Two Foes' (1899) 'The Vagabond' (1893); 'Jess of the Bar Z Ranch' (1896); 'Down the Santa Fé Trail,' and the novels 'Thirteen Stories of the Far West' (1887); 'The Rancho of Heavenly Rest' (1892); 'The Investigators,' etc.

Hegel, George William Friedrich, philosopher, especially famous as the most systematic and historically influential of the post-Kantian German idealists, was born in Stuttgart, 27 Aug. 1770, and died as professor of philosophy at the University of Berlin, 14 Nov. 1831. He attended as a boy and as a youth the Gymnasium of his native city, and in 1788 was matriculated at the University of Tübingen, where he studied theology, and where he finished his course of study in 1793. From 1793 to 1796 he was private tutor in Switzerland, devoting his leisure, meanwhile, to theological and historical studies. In 1797 he accepted a private tutorship in Frankfurt, and remained there until 1800. During this period he wrote out the earliest sketch of his philosophical system, and, resolving to devote himself to philosophy, went, in November 1800, to the University of Jena, as Privatdocent. Here he lectured on philosophy until the troubles which followed the battle of Jena in October, 1806, interrupted for a time his scholarly work. During the years between 1800 and 1806 Hegel's philosophical teachings had assumed a much more highly organized form; he had published a number of important essays; and at the moment of the battle of Jena was just completing his first great systematic treatise, the 'Phänomenologie des Geistes,' i.e. the 'Phenomenology of Mind.' Unable to obtain, for the time, satisfactory opportunity as an academic teacher, Hegel thereafter passed a year as editor of a journal in Bamberg; and then obtained a position as rector of a gymnasium in Nürnberg, in 1808. He married the daughter of a distinguished Nürnberg family in 1811. Thereafter, while still at Nürnberg, he wrote his most important and finished philosophical treatise, the 'Logik,' in the years 1812-16. In 1816 he was appointed to a professorship of philosophy at the University of Heidelberg. In 1818 he accepted a call to the University of Berlin, where he rapidly won a position of the greatest influence, gathered about him many hearers and disciples, and became the head of

a school of philosophy whose influence upon contemporary German thought was of the greatest. During his life he published, in addition to the works already mentioned, a summary statement of his whole system of philosophy entitled 'Encyclopädie der Philosophischen Wissenschaften,' and a treatise on the 'Philosophy of Law.' His lectures on the 'Philosophy of Religion,' on the 'History of Philosophy,' on 'Æsthetics,' and on the 'Philosophy of History,' were published posthumously. His complete works, including his letters, fill 19 volumes, which were edited by a group of his friends, in the years immediately following his death (excepting only the letters, which in their definitive edition, were published as Volume XIX of the works by his son, the historian, Karl Hegel, in 1887).

Hegel's philosophical position can only be understood in the light of his relation to Kant. Immanuel Kant (q.v.) (1724-1804), became, by the publication of his 'Critique of Pure Reason,' in 1781, the leader in the movement of modern German philosophical thought. In an age when the guidance of "Reason" was especially glorified by all the leading liberal and progressive teachers and parties of the day, Kant undertook a systematic inquiry into the nature, the limits, and the scope of the human reason. Previous philosophers, in the 17th and 18th centuries, had been especially divided in opinion regarding the question whether experience or reason is the source of our knowledge. Kant undertook to reconcile the conflicting views regarding this problem, and at the same time to map out, in a systematic way, the whole field which is accessible to human science. His result was, in substance, as follows: Human knowledge depends upon two factors, experience, and our own intelligence. Both factors are equally necessary for knowledge. Experience, when viewed apart from our intelligence, is a collection of mere data of sense, which are given, but which, in so far as they are *merely* given, are meaningless. The data of sense get their coherence solely through the active work of our intelligence. Our intelligence, whose manner of acting is spontaneous, is indeed awakened to reaction only through sense, and can give us knowledge only with reference to the facts of experience; but the data of sense get all their form, coherence, structure, meaning, only through the fact that our intelligence is guided in its activity by certain "categories," and formative principles, in terms of which we interpret these data, view them as due to coherent "objects of experience," and connect these objects so that the latter form the "world of experience." Without the intelligence, then, with its "forms," no coherent experience is possible. Sense shows us, by itself alone, no objects, no connections of objects, no laws, no facts, no world. That we appear to find, in our world of perception, connected things, subject to laws, is due to the more or less hidden work of our intelligence, which gives form to the otherwise incoherent sensations. That we all have the same phenomenal world to deal with is due to the fact that intelligence is common to us all, in the same forms.

In consequence, what we know, and what our sciences of experience study, is neither a



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world of things simply given to us as brute facts from without, nor yet a world of mere sensations. On the contrary, what we know is the world of experience as our active intelligence inevitably *interprets* experience. Hence we know, not "things in themselves," but "phenomena," and not mere "data" of experience, but experiences as interpreted by the active constructive work of our intelligence.

Meanwhile, our intelligence, upon its higher levels, is indeed not content with this mere interpretation of the contents of sense, but,—still in its own spontaneous way,—defines ideals of objects and of laws which far transcend,—according to our own conception,—the facts of experience. The "Reason" proper, as distinct from the "Understanding" (that is, from the intelligence which merely interprets and renders coherent our experience), is the part or aspect of our intelligence which is concerned with these other and "transcendent" objects. The objects of the "Reason" proper, are objects which no human experience can reach or exemplify, and which we therefore conceive as lying beyond any possible experience. Such objects are God, the human ego itself, in its true nature, the cosmos in its entirety, and the moral law. Such objects we cannot, in any scientific sense, "know," just because our knowledge is limited to our interpretation of experience,—an interpretation due to the functions and to the categories of our lower intelligence, i.e. of our "understanding." Yet if the "transcendent" objects of the "pure Reason" cannot be "known," they nevertheless can be and must be "postulated," by virtue of a certain active and spontaneous "faith" which the Reason warrants. For these "transcendent" objects have for us a moral value, and give a meaning to life.

We, "know," then, "phenomena." Our "Reason," meanwhile, gives us "faith" in certain "Ideas" which relate to the "transcendent" objects. This faith is not knowledge, but is rationally warranted. It is the office of philosophy to bring to consciousness the "categories" in terms of which we inevitably interpret phenomena, and so organize our experience and get our science. It is also the office of philosophy to discover and define the "Ideas" in terms of which we just as inevitably organize our moral conduct, and give meaning to our practical life.

So, for Kant, this view of philosophy differs from the view of older philosophy in limiting our inquiries to the business of *interpreting experience and organizing life*. The philosopher then, is above all concerned with the universe, as the human Self, that is, as the Self which is, in type, the same in all of us, sees the universe, acknowledges it, and gives to it, in the form in which we experience its presence, the type of rational coherence. Any world which is not the world as the Self views it, is unknowable, and is a world of "things in themselves."

Hegel, in common with the other post-Kantian German idealists, builds upon the basis of this Kantian analysis of knowledge and of reason. His dependence upon Kant is shown by the very fact of his frequent and persistent criticism of that philosopher's positions. That Hegel's results are in one sense far removed

from those of Kant becomes obvious upon a very brief consideration. But that, however much Kant's doctrine is transformed in Hegel's system, it is still Kant whose views are the principal ones thus transformed, is also certain. The relation can be made more explicit by the following statement of the contrast between Kant and Hegel:

1. The result of Kant's philosophy is that the accessible world is the world as the rational nature of the human Self requires us to interpret it. This result lies at the basis of Hegel's doctrine. But Hegel transforms it by dropping out of consideration, the adjective "accessible," as being superfluous. It is useless to talk of a world of unknowable or inaccessible "things in themselves," as Kant does. The world of reason is simply the world. There is nothing to know except what the nature of our intelligence requires us to acknowledge. Discover the secret of reason, and you have discovered the secret of the universe. This is the first characteristic thesis of Hegel's idealism. "Behind the curtain which is said to hide the inner nature of things," says Hegel in the 'Phenomenology,' "there is nothing, unless we ourselves go behind that curtain."

2. Kant furthermore divides the work of our intelligence between the activity of the "Understanding," which interprets special experiences, and the "Ideas" of that "Reason," which "postulates" our relations to ultimate reality. Hegel accepts this distinction as valid within its limits, but not as any absolute distinction. Our intelligence may and often does fix its attention upon fragments of knowledge. In that case it "abstracts" from the whole meaning of its own life, and thereby becomes *ipso facto* an "abstract thinking" or "understanding" of this or that object or law. Such abstractions are useful, and inevitable. But they are not final. The truth, however, is in Hegel's phrase, simply "the whole." Only that form of reason therefore which is concerned with the *whole* meaning of life is genuinely philosophical. But since this meaning is, after all, our own meaning, the meaning of the Self, it need not be simply a matter of "Postulates." It can be known to us.

3. Kant limited our knowledge to "phenomena." But this "limitation" loses its significance if once we see that there are no "things in themselves" to know. The world is for us a world of mere "phenomena" only in so far as we do not grasp the principle of which our experience is the expression. But, for Hegel, this principle is simply the absolute principle which lies at the basis of our own nature. As this absolute principle is not foreign to the Self the Self can grasp the principle. When it does so, it sees phenomena as the inevitable expression of the meaning of its own life. And then its phenomena become once more "actualities," as real as any finite facts could be. What we know then is not a mere world of phenomena. It is a world of absolute Truth.

4. Our ethical ideals form, for Kant, a world of their own, which we can never *know* to be real, but which we can, and must, *believe* to be real. This contrast of ideal and real, of knowledge and faith, Hegel believes to be founded only in a historical difference of cer-

tain stages of our own self-development. Faith, if once brought to a clear self-consciousness, becomes a knowledge as to what the absolute Self is and determines. And this knowledge philosophy can attain. Such a knowledge is *ipso facto* a knowledge of truth. For all truth is in and of the true Self, i.e. the Absolute.

5. Kant, in trying to define the categories which lie at the basis of our interpretation of the world, had simply accepted those categories which he observed to be in use in our daily thinking, and in science. He treated them as a fixed set of principles. Regarding the origin and the mutual relations of these categories he has no extended theory. The categories are, for him, ultimate facts of our intelligence, determining its constitution, but of unknown source. Hegel, on the contrary, regards it as one of the principal tasks of philosophy to show why and how we come by just these categories which we use in the interpretation of experience, and in the ordering of life. His principal work, the 'Logic,' is devoted to such a treatment of the categories. And in fact, since, from Hegel's point of view, the world of "Thought" is the only real world, or, in other words, since the constructions of that absolute process which embodies itself in our thought and in our life are constitutive of *all* truth, this Logic, which is to show the true genesis and nature of the Categories, takes the place of all that, in the older philosophical systems, had been called Metaphysics. For the theory of the absolute constructive process which expresses itself in our experience and in our thinking is simply the theory of the universe. There is no other world to know than this world which thought constructs, which experience observes, and which constitutes our life and its meaning.

6. For Kant, nothing absolute is knowable. All our knowledge is relative. For Hegel, absolute knowledge is possible; for whoever knows the principles that determine the true nature of our thought and of our life, finds these principles, as the expression of the true Self, absolute.

This contrast of the positions of Kant and of Hegel may help to give the Hegelian philosophy its proper historical setting, without which it inevitably appears to be a presumptuous attempt to transcend the natural limits of human reason. For Hegel, these limits are not what they seem. That is, they are not absolute limits. For what we have to consider, when we philosophize, is not a foreign world, but is rather the whole truth with regard to the meaning of the very life which we ourselves are experiencing and are living.

In his first great work, the 'Phänomenologie,' Hegel gave an account of the various successive stages through which the human mind, as it appears in history, passes, in its transition from a naïve dependence upon the senses to the stage of philosophical reflection. In his 'Logik,' as has just been stated, Hegel undertakes to describe the way in which philosophical reflection leads us to the categories. The categories themselves are successive stages or phases of our interpretation of absolute truth. Their succession itself is determined by a certain "dialectical" procedure, whereby the lower categories are, through an immanent development, transformed into the higher cate-

gories. In the system of Hegel, as he planned the order of its parts, the 'Logik' is next followed by the 'Naturphilosophie,' or 'Philosophy of Nature.' The only connected treatment which this portion of the system ever received is the mere compend contained in the second part of Hegel's 'Encyclopädie.' The 'Naturphilosophie' consequently remained, from Hegel's point of view, imperfectly worked out. The third portion of the system was the 'Philosophy of Mind.' This also was left without adequate working out by the philosopher, although in his 'Rechtsphilosophie,' in the third section of his 'Encyclopädie,' and in his posthumously published lectures, there is a very extended treatment of various parts of this concluding portion of his undertaking. Under the 'Philosophy of Mind' Hegel included, first the whole range of psychology, and the philosophical theory of the relations between nature and mind; secondly, ethics and the philosophical theory of the state; thirdly, philosophical aesthetics, or the theory of the beautiful; and finally the philosophy of religion.

The range and general intention of the Hegelian doctrine are thus suggested although, owing to the vast range of his undertaking, this can here be done only in a very inadequate way. Further characteristic of the philosopher are especially (1) his "dialectical method," and (2) his theory of the Absolute.

By the dialectical method Hegel means a procedure of which some of the dialogues of Plato give us classical instances, and which Kant's "Antinomies" as well as Fichte's method of procedure in philosophy had exemplified, although the systematic use of the method in Hegel's way is due to his own initiative. Truth, according to Hegel, comes to us, in the first place, through the medium of "immediate" experience. Without such experience, we could indeed proceed no further on the way toward insight; and this is the permanent justification for "empiricism" in philosophy, if only we observe that this barely immediate experience, although indispensable, remains meaningless unless we transform experience through the activity of our thought. Thought begins by observing that immediate experience, taken merely as it comes, is, so far, not yet intelligible. The first work of our thought is therefore to classify, to divide, to fix upon distinct aspects of facts, to form generalizations and so to convert what comes to us as immediate into the abstract form of our various *Gedanken*, or conceptual constructions. This is, so far, the work of "the Understanding." Such work first results in our regarding truth as something which, on the one hand, is fixed, *universal*, and abstract, while, on the other hand, this world of truth also appears to us to be a world of infinitely *various* special truths, which relate now to this and now to that individual thing, or fact, or law. So far as our understanding dwells upon the fixity, the universality, the abstract generality of its truths, it finds, or endlessly seeks to find *unity* in the world. But so far as the understanding, even in this very effort to discover unity, singles out now this and now that fact or law, it is confronted by the *variety* of the results which it reaches. There results the well-known problem of "the One and the Many." In consequence, the un-

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derstanding is involved in contradictions which are simply inevitable. In the world of the understanding, "everything is self-contradictory," and is so just *because* the understanding makes formal consistency the one test of truth, even at the very moment when it expresses its search for truth in the form of an effort (1) to divide what is inseparable, and (2) to substitute abstractions for life.

The forms which the resulting contradictions assume are well known in the history of philosophy. The interest in abstract unity is shown in extreme form in the Eleatic reduction of the whole world to a simple One Being, by contrast with which all variety is illusory. The Atomistic thesis, which reduces all the qualitative variety of nature to quantitative differences, the material substance of Descartes, whose only attribute is extension, the sole substance of Spinoza,—these are also consequences of the tendency to understand variety by reducing it to an abstract and lifeless unity. On the other hand an equally abstract pluralism, in all the earlier stages of philosophical thought, has emphasized variety, with the result of making it inconceivable how the facts, when regarded as thus mutually isolated, could conspire to make a world at all. Views of one type have, by their very contradictions, led over to views of the opposed type.

The solution of all such difficulties lies in reducing the contradictions to their "ground," which lies in the very "movement" of thought itself. For the truth of such views lies in their synthesis, not in their mere conflict. Such a synthesis is furnished by the discovery that the search for unity and the interest in diversity and variety are but "aspects" or "moments" of that life of self-comprehension in which the very nature of reason consists. When thought, by virtue of a deeper reflection upon the contradictions of the understanding, has reached this higher stage of the reason proper, it therefore views the successive opposing views as inevitably one-sided expressions of different aspects of our rational interest. Our world is indeed one; and in order to bring this fact to our consciousness, we have, upon the stage of the understanding, to emphasize this very aspect of Being and of the life of our own thought to such an extent as to isolate, by our abstraction, the unity upon which we then dwell, from the very variety of which it is the unity. Now unless we passed through the stage of doing this we should never bring the unity of things to light at all, but should leave this aspect of the "immediate" lost in the original obscurity in which, apart from thought, all experience is involved. But so long as we remain upon this stage of abstract reflection, we nevertheless inevitably contradict both experience and ourselves. For experience is of the many, as well as of the unity. And an abstract unity, which is the unity of nothing, is indeed a self-contradiction.

But while our world is indeed also many, and while, in order to bring this aspect of things to light, we must emphasize pluralism, yet the resulting views, taken in their abstraction, are as contradictory as are those of mere monism. The many could never coöperate in one world were they not also one.

Thus we cannot reach truth without pass-

ing through contradictions. For the truth is a synthesis of various points of view. No one of these can be appreciated unless it has first been emphasized. If once emphasized it becomes, however, in its isolation, self-contradictory, just because it has its truth not in its isolation, but in its relations to the other points of view. But in order to be able to see that these very relations are necessary, and are not merely adventitious and empirical, we must see *how* the isolated point of view contradicts itself. The sequence of these isolations of special categories (followed by the resulting contradictions, and by the necessary synthesis), constitutes the "dialectic movement of thought," by which the "immediate" experience, with which we begin, is transformed into the system of truth, wherein all the elements appear in necessary interrelations to one another. The principle of this method is what Hegel calls the "Negativity" of thought. *The denial, or sublation of imperfect stages of insight is the only means whereby the perfect stage can be made explicit.* This is the principle of the dialectical method.

The Hegelian theory of the Absolute is the correlate of this theory of the process whereby truth is acquired. For the dialectical method is not only a method of acquiring insight; but, since thought is, in principle, identical with the very life of the universe, the method by which we come to insight is also the very method by which the life of the world is developed. Man is simply the world come to self-consciousness,—the Spirit explicitly aware of its own life. This is the obverse aspect of the thesis that the true Self is the world. Viewed objectively, the Hegelian doctrine accordingly is that the world-ground, or "the Spirit," also called the Absolute, has a life, or activity, whose forms are expressed in the categories of the 'Logic.' This life has first to manifest itself in experience as a world of immediate facts. This immediately given outer world constitutes what we call Nature. Such a world has to exist, and to be found by us, in order that the forms of thought should be, not *mere* forms, but forms expressed in a concrete and immediate way. In live, and especially in rational beings, the thought which is everywhere present in nature reaches a still higher expression, which at last becomes identical with our own insight, as this insight develops through the historical evolution of humanity. The entire world-process is therefore the complete expression of a rational spirit, which indeed eternally possesses self-consciousness, but which, when viewed historically, appears to us as attaining such self-consciousness, in individual form, in the religious and in the philosophical consciousness of man.

This must suffice as an outline of Hegel's main thoughts. Owing to the interest which he had in viewing the entire course of human history as a series of movements determined by the dialectical processes of which all our life, according to him, consists, Hegel took great interest in the philosophy of history. The influence of his school has been, in consequence, of great importance in affecting the spirit of a great number of modern historical inquiries. The highly ambiguous relations of the Hegelian system to traditional theology

proved very momentous for the development of the critical study of religious dogma, and of religious history, during the generation after his death. While the original Hegelian school ultimately lost its direct influence in Germany, the indirect influence of the Hegelian system still remains very great, and is especially noticeable in English and American thought since 1865.

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Hegira, həj'ī-ra, Hejra, or Hijra, an Arabic word meaning "going away," commonly used to indicate Mohammed's flight from Mecca, in 622 A.D. In 639 Caliph Omar instituted a new Moslem calendar, to begin with the first day of the first month of the year in which the flight took place. The Mohammedan year, as a lunar year, is shorter than ours by ten days, 21 hours, and 14 2-5 seconds. A rough and ready method for finding the year in our calendar corresponding to a given year in the Mohammedan is to subtract from the latter 1/33 of itself and add 622 to the remainder. To find the precise year and day, multiply the year of the Hegira by 970,224, strike off from the product six decimal figures and add 621,5774; this will give the year of the Christian era; and the day of the year is got by multiplying the decimal figures by 365.

Heidelberg, hī'dēl'bērg, Germany, an old university town in Baden, on the left bank of the Neckar, here spanned by two bridges, 11 miles by rail east-southeast of Mannheim. It stands on a narrow strip between the river and the rock on which the castle is built, and chiefly consists of the Hauptstrasse, the long main street, and less important steeply-sloping cross and parallel street. The city has an electric street railway system. The imposing castle, on a height above the town, an immense ivy-clad ruin begun in the 13th century, exhibits elaborate examples of early and late renaissance architecture. In the town itself the principal buildings are: the Gothic church of St. Peter, the Gothic church of the Holy Ghost, the Roman Catholic Church, the university (q.v.), the town-house, the post-office, gymnasium, real-schule, and other schools. The manufactures, comparatively unimportant include cement, tobacco, cigars, fire-extinguishing apparatus, shoddy mathematical and surgical instruments, leather, etc., and there are also several breweries. One of the curiosities of the place is the well-known Heidelberg copper tun, kept in the cellar under the castle, and long ranking as the largest wine cask in the world, being 36 feet in length, 26 feet in diameter, and capable of holding 800 hogsheads. Heidelberg has fine public walks. The gardens around the castle are well laid out, and at every turn present the finest views of the Neckar, and the fertile and richly wooded valley through which it winds to join the Rhine. Behind the town and castle, a carriage-road leads by easy ascent to the top of the Königstuhl, the loftiest hill of the district, from which an extensive view is obtained of surpassing

beauty. Heidelberg arose around its 13th century castle and was until 1719 the capital of the Palatinate. In 1622, 1688, and in 1693 the French captured and pillaged the city. In 1802 it was united to the Grand Duchy of Baden. Pop. about 40,000.

Heidelberg Catechism, a religious work published at Heidelberg in 1563 by Zachariah Ursinus for the use of the Reformed Church, and published in the Palatinate. It was approved by the Synod of Dort, and was the model on which the Westminster Assembly framed the Shorter Catechism.

Heidelberg University, Germany, a renowned institution founded by Elector Rupert I. in 1386. It was organized by Marsilius von Inghen on the model of the University of Paris, and at the Reformation, from a Catholic became a Protestant stronghold of learning. It flourished till the period of the Thirty Years' War when it declined. In 1802 under the administration of the Grand Duke of Baden, a new era was inaugurated and the university rapidly became famous. It is very complete in its details, and comprises faculties of theology, law, medicine and philosophy; the famous library has over 500,000 volumes and 4,700 MSS. There are 150 professors and instructors, while the average annual attendance of students in all departments is over 1,450. Many of the most famous German scholars have been professors here—Melanchthon, Ursinus, Olevianus, Reuchlin, Ecclampadius, Spanheim, Puffendorf, Voss, Schlösser, Creuzer, Gervinus, Paulus, Kuno Fischer, Helmoltz, Bunsen, Blüntschli, etc. The quincentenary of the university was celebrated with elaborate ceremonial in 1886.

Heidelberg University, Ohio, a coeducational institution at Tiffin, founded in 1850, under the auspices of the Reformed Church in the United States. It has departments of theology, commerce, oratory, art, and music, and preparatory and summer schools. In 1910 it had 25 professors and instructors; 337 students; a library of over 25,000 volumes; the grounds and buildings were valued at \$125,000; the productive funds amounted to \$317,000, and the income to \$67,000.

Heidenmauer, hī'dn-mow-ēr. (1) A name given in Germany to the remains of old German and Roman fortresses and ramparts, some of which still exist, especially at Ottilienberg, a hill of the Vosges, in Alsace. (2) The title of a novel by James Fenimore Cooper, who laid the scene of his story in the Vosges during the Middle Ages.

Heights, Measurement of. See **HYPSOMETRY**.

Heilprin, hīl'prīn, Angelo, American naturalist; b. Satoralja-Ujhely, Hungary, 31 March 1853; d. New York City 17 July 1907. He came with his parents to the United States in 1856, but received his education later in Europe, making a special study of natural history. On his return to America, his scientific ability was speedily recognized and he became successively professor of invertebrate palæontology and geology (1880-1900), and executive curator (1883-91) at the Academy of Natural Sciences, Philadelphia. From 1885 to 1890 he was pro-

fessor of geology at the Wagner Free Institute. He was for five years president of the Geographical Society of Philadelphia, was leader of the Peary Relief Expedition in 1892 and made a journey of research to investigate the cause of the Mont Pelée (q.v.) disaster in 1902. His published works include: 'Contributions to the Tertiary Geology and Palæontology of the United States' (1884); 'Town Geology'; 'The Lesson of the Philadelphian Rocks' (1885); 'Geographical and Geological Distribution of Animals' (1887); 'Explorations on the West Coast of Florida and in the Okeechobee Wilderness' (1887); 'The Geological Evidence of Evolution' (1887); 'The Animal Life of our Seashore' (1888); 'The Bermuda Islands: a Contribution to the Physical History and Zoology of the Somers Archipelago' (1889); 'Principles of Geology' (1890); 'The Arctic Problem and Narrative of the Peary Relief Expedition' (1893); 'The Earth and Its Story' (1896); 'Alaska and the Klondike' (1899); 'Mont Pelée and the Tragedy of Martinique' (1903); 'Tower of Pelée' (1905).

Heilprin, Louis, American scholar: b. Miskolcz, Hungary, 2 July 1851. He is a brother of Angelo Heilprin (q.v.). In 1856 he came to the United States, where he was privately educated, and where he was connected with various works of an encyclopædic character. He published a valuable 'Historical Reference Book' (1884; 6th ed. 1899) in 'The Concise Knowledge Library.'

Heilprin, Michael, American author: b. Piobrkow, Russian Poland, 1823; d. New York 19 May 1888. Carefully educated by his father, in his 20th year he emigrated to Hungary, chafing under Russian conditions. For a time he had a book-store at Miskolcz and was on intimate terms with Kossuth and his party. When the Revolution was quelled, he went to London, there meeting Kossuth, who advised him to go to America. In 1859 he and his family emigrated to New York, where his literary activity was continuous for nearly 30 years. As co-editor of Appleton's 'Annual Encyclopedia' and reviewer on 'The Nation,' he won a distinct rank for his exact and versatile scholarship, especially in the line of Semitic literature. On the arrival of the Russian Jewish refugees in 1881-2, he took a prominent part in their welfare and personally supervised the colonization of many families. His published works include: 'The Historical Poetry of the Ancient Hebrew,' Vols. I. and II. (1880); 'Bibelkritische Notizen' (1893).

Heimburg, him'boorg, Wilhelmine. See BEHRENS, BERTHA.

Heine, Heinrich, German poet: b. Dusseldorf, 13 Dec. 1797; d. Paris, France, 17 Feb. 1856. His father, Samson Heine, of Hanover, was a merchant of honorable family, which sprang from Bückeburgo. He was good natured but without marked intellectual gifts and of little business ability. The mother, Peira (Betty) van Geldern, came from one of the oldest and most prominent Jewish families on the Rhine. Her father, Gottschalk, was one of the first Jewish physicians who graduated as Med.D. from a German university; her brother, Joseph, was also a graduate. Her uncle, Simon van Geldern,

was a strange, adventurous, enthusiastic man. He journeyed through all Europe, went to Jerusalem, and returned from there to Germany after a varied and checkered experience. His diary of travel and other writings are still preserved. The fate of this strange relative made a deep impression on the mind of the mature and gifted boy, who first was sent to a private school and then to a lyceum in charge of priests until the year 1814. The greatest influence on his education was exercised by his intellectually gifted mother, who read Rousseau and Goethe and was an enthusiastic German patriot, while his father was just as enthusiastic for Napoleon. Between these contrasts Heine, in his youth, swayed constantly in both directions. The whole life of the poet can be described in one sentence: He was a German, who was born of Jewish parents in a Roman Catholic city on the Rhine in the period of Napoleon's supremacy on the one hand and of flourishing Romanticism on the other. In these words lies the entire biography of Heine, everything which uplifted and hampered, all his defects and excellences, and all the deep contrasts and dissonances with which his life was filled.

When he left the gymnasium, he was ready with his companions to volunteer in the struggle against Napoleon. His first poems glorify German custom and loyalty, German patriotism. But this spirit soon changed, and soon, like so many eminent Germans of the time, he became one of the most enthusiastic supporters of the Emperor's heroic figure, whose fame then filled the entire world. His most ardent wish at that time was to study. But his parents, whose business was already in decline, could not gratify this desire; and even his rich uncle, the celebrated banker, Solomon Heine, in Hamburg, on whose bounty the whole family in reality lived, preferred to have the youth become a clever merchant. So his father in 1815 took him to the Frankfort Fair (Messe) and placed him there with the banking firm of M. G. Rindskopf. But the position was not long to Harry's taste nor was a grocery more endurable. After a short time he returned to Dusseldorf. The attempt was now made to have him settle in Hamburg, first in his uncle's counting-house and then in an independent concern of his own, which was a branch of his father's business. But he showed little talent as a merchant and in 1818 his firm failed.

First Effort as Poet.—In the three gloomy years at Hamburg, however, Heine became a poet. Under the pseudonym "Sy Freudhold Riesenharf" appeared in those days in a Hamburg magazine his first 'Traumbilder' and poems. A luckless love for his rich uncle's fair daughter Amelia filled his heart and aroused those lamentations of deep sorrow, which formed the basis of his poetry. The well known poem, 'A youth loves a maiden, who chose another' contained almost literally his entire heart's romance. After it was shown that Heine had absolutely no mercantile ability, his uncle finally consented that he might study law.

His University Career.—In October 1819 he entered the University of Bonn, which had just been reopened. A fresh and stimulating spirit prevailed at this university both among teachers and pupils. Men like August Wilhelm v. Schlegel, who interested himself very much in the

young poet; E. A. Arndt, and others, belonged to the teaching staff. Among the students we find names like Wolfgang Menzel, Hoffmann v. Fallersleben, Hengstenberg, etc. His special friends were Friedrich Steinmann, J. B. Rousseau, and Josef Neunzig. In the vacation, after the first year of study, Heine resided in the little town Beuel, near Bonn, and there he worked on his first tragedy, 'Almansor,' the plot of which was placed in the period of Moorish decline in Spain. In the poem, however, Heine wished to present a picture of the battles which Judaism in Germany had to endure. 'Almansor' is a lamentation of crushed and persecuted Judaism. From Bonn Heine went to Göttingen, whose faculty of law was quite famous at that time. But he did not enjoy its instruction very long, for he had to leave the university on account of a duel, and in February 1821 came to Berlin.

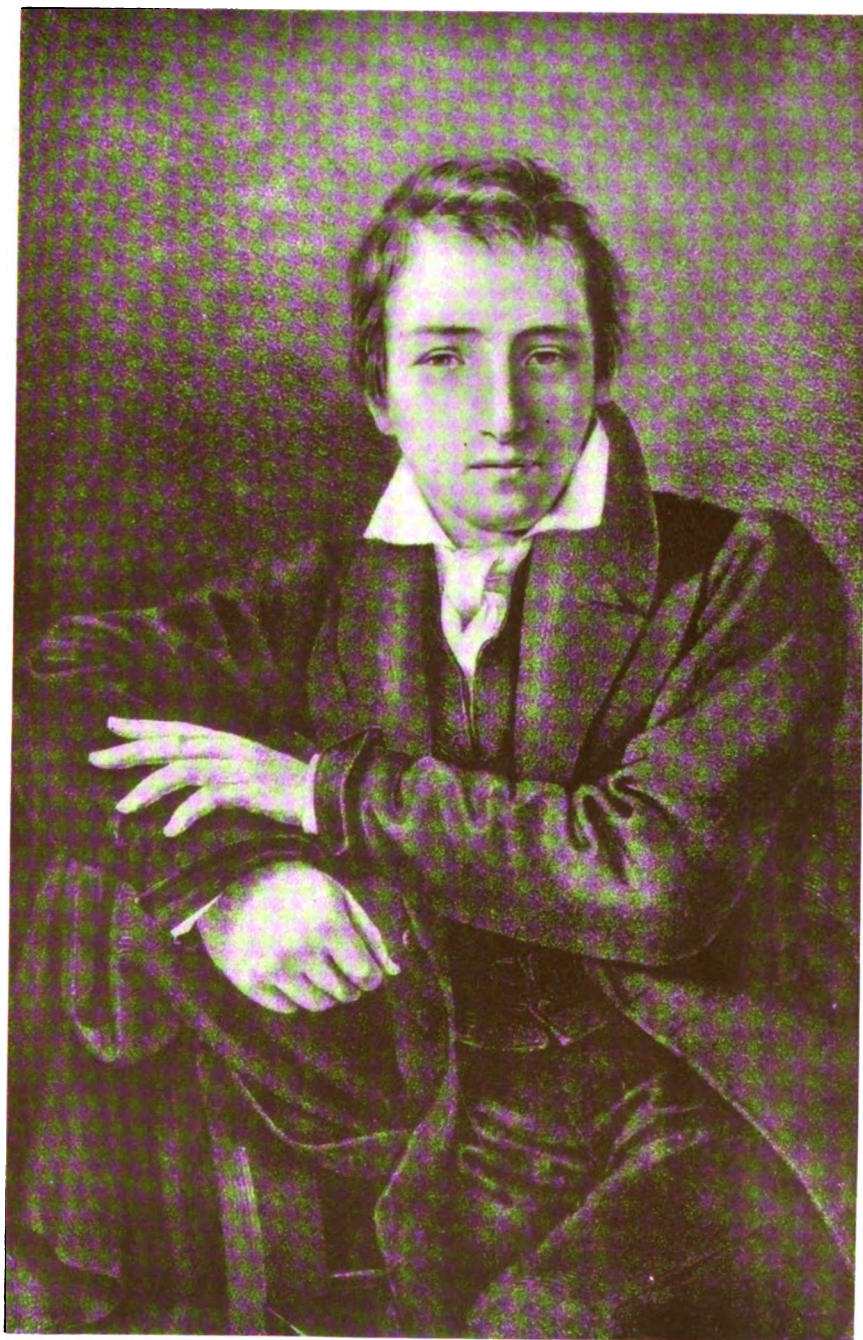
Life at Berlin.—His choice of Berlin was fortunate for the young poet. A vigorous intellectual atmosphere prevailed in that era in the Prussian capital. Before everything else he was attracted by the best salon in which Rahel Varnhagen von Ense had her special circle with Gوته (q.v.) and Fichte together with a coterie of brilliant spirits. Both she and her husband quickly recognized the poetical power in Heine, and admitted him to close intimacy. Her brother Leopold Robert, who was also a poet, was exceedingly friendly to him, and his wife Friedricka aroused Heine's enthusiastic adoration in sonnets and songs. The second coterie which fascinated Heine was a round table of young poets who gathered in Lutter and Wegener's restaurant, made famous by Ludwig Devrient and E. T. A. Hoffmann, which was to become the scene of more than one carouse. These men were Christian Dietrich Grabbe, Friedrich v. Uechtritz, Karl Köchy, L. Gустorf, and others. A third circle formed the greatest possible contrast to the others and in this, perhaps, Heine felt most at home. It was a small body of young men who in a time of general apostasy from Judaism, assumed as their task the reform and development of Judaism which then was regarded as in its decline. At the head of these resolute workers stood Eduard Gans, the celebrated jurist, Moses Moser, a merchant, whom his friend Heine called a living epilogue to Lessing's 'Nathan,' and Leopold Zunz (q.v.), the immortal founder of that branch of critical research called the science of Judaism. Heine took the deepest interest in the labors, hopes, and disappointments of this society. A monument of his love for the general cause which was abandoned by them, is embodied in his romance, 'The Rabbi of Bacharach,' which was then begun but unfortunately remains a torso.

Literary Activity.—In Berlin, too, the university fairly fascinated him. In particular the philosopher Hegel (q.v.) made a deep impression on the young poet, whose first poems were issued by a Berlin firm in 1823 and aroused general interest, and he was termed a successor of Byron, the first poet of "Weltschmerz" in Germany. Varnhagen v. Ense and Karl Immermann, both famous writers of the time, showed special ardor in directing the public's attention to the young poet, the new star on the literary horizon, who was already arousing general comment by his 'Tragedie' (Almansor and

Ratcliffe) as well as by his 'Lyrical Intermezzo' which appeared in a volume at the same publishers'. When Heine in 1824 went for a second time to Göttingen, in order to undergo his doctor's examination, he was already a well-known personality in literary circles. During this period of his second stay in Göttingen occurred an act on his part which is wholly unintelligible, judged by his previous labors, his writings, and letters, and which can only be explained by the sad conditions of the time—on 28 June 1825 at Heiligenstadt, near Göttingen, he embraced the Protestant religion. Clearly this act was done only to promote his professional career, for his sympathies in increased degree remained on the side of his coreligionists. Heine regretted the step his entire life.

His Choice of Literature as Profession.—After his graduation as doctor of law he returned to Hamburg. But all his efforts to maintain his hold there or in Berlin were unavailing despite his baptism. The failure was due either to the prejudices of the time or to other drawbacks. So Heine devoted himself wholly to literature. Two years earlier he made a journey from Göttingen to the Harz Mountains, in the course of which he visited Goethe at Weimar, but met a rather cool reception. This journey he now described in his 'Harzreise,' which had many readers who were delighted with the new and fresh tone in which the varied and picturesque experiences were narrated. In the years 1826-1831 Heine's rank as poet was firmly established. That period forms the crown of his life and activity—his high-water mark of achievement. The four volumes 'Reisebilder' ('Pictures of Travel') published 1820-1831, showed him from an entirely different point of view. His 'Buch der Lieder' ('Book of Songs'), gave on the other hand, a faithful picture of his lyrical skill, which also struck entirely new paths. Heine had emerged from romanticism. He knew its mysteries and magic spells. Close thereby, or rather far above it, stood the well of German popular poetry, out of whose depths he drew such wealth as no other German poet had accomplished. Goethe and Uhland, Brentano and Wilhelm Müller were not without their influence on the matter as well as the metrical form of his poems; yet he was original and his songs aroused a practical revolution in the world of German poesy.

His Genius and Its Influence.—The secret of his originality and of the marvelous influence which he exercised not only on his contemporaries, but also on every age, lies in the peculiar charm which characterizes these songs, as they sound the tenderest tones of the heart, and then in cutting dissonances shatter the sentimental quality which is at their basis, thus producing a humorous-poetical effect incomparable in its way. The subjectivity, with which Heine wove his sorrows, whether trivial or serious, in the warp and woof of his verse, was something unheard of in the history of German poetry. There was as little hypocrisy in his feeling of sorrow (Weltschmerz) as in that of Lord Byron, but it was truer and deeper, because it was blended with the Jews' sorrow from gray antiquity. His pictures and thoughts, his Oriental sensuousness, and his German sensitiveness, all this in its combination formed



HEINRICH HEINE.

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a poetical *ensemble* which was to destroy romanticism, with its fairyland of legends, and to construct the poetry of a new age and a new generation. The verse included a mass of new poetical material; for instance, the description of the sea in the splendid-colored North Sea pictures. In marked contrast was the wonderful effect produced by the form of the poems, which, apparently somewhat careless, was really intentional and just adapted to elevate the mood. With his 'Book of Songs' Heine became at once the first German poet of his time. His prose writings exercised in those days a similar influence. Heine loosened the tongue of the modern man of culture; he taught him what and why he suffers. In an age which was gloomy, depressed, and poor in deeds, he unfurled the banner of freedom and announced to the young generation the dawn of new days which had to come. While much in his 'Pictures of Travel' was of transient worth and importance for the history of civilization, of permanent value was the blending of humor and sentiment, wit, and earnest reflection, wherein following his great predecessors, men like Laurence Sterne, Jean Paul, and others, he created an entirely new *genre*. The modern Feuilleton rest wholly on Heine's prose. The "Young Germany" school which gave the death-stroke to romanticism in the 30's of the past century followed in his steps. His travel picture and sketch remained for decades a model for young German writers after which to pattern their prose.

Further Activity.—Despite his popularity, however, Heine could never attain a life of entire self-reliance in the conditions of his age. His steady dependence on his rich uncle, who let his nephew feel his power, embittered his stay in Hamburg. Accordingly in 1827 he accepted the offer of Cotta, the publisher, to assume the editorship of the Munich 'Political Annals.' But he continued at this work only one winter; then he undertook a journey to Italy, which he described in his incomparable fashion in his 'Pictures of Travel.' He expected to receive on his return a professorship at the Munich University, which the Bavarian minister Eduard v. Schenck desired to secure for him from the king; but owing to the intrigues of the clericals all efforts in Heine's behalf were unavailing.

In 1828 he was recalled from his Italian trip by the news of his father's death—a man whom Heine had most tenderly loved. The following years were occupied in violent attacks on the poet August v. Platen and his followers, whom Heine regarded as his worst foes, besides literary labors and traveling. When the intelligence of the July Revolution in Paris reached him, the poet could no longer endure the home atmosphere, while the powerful Austrian chancellor Mettenich, who found refreshing youth "in the melancholy waters of his lyric" warned him that he was not entirely secure from persecution. It was on a May day in 1831 when Heine forsook his fatherland, of course of his own accord, but in the firm conviction that sooner or later he would suffer the fate of all those who were leaders of freedom in Germany.

His Life in Paris.—In Paris Heine labored from the very start at the great task of his life

—to promote an understanding between the French and the Germans. His correspondence in the 'Augsburger Allgemeine Zeitung,' his book on 'The Romantic School,' his contributions to 'The History of Religion and Philosophy in Germany,' are devoted to this great purpose. The first appeared in 1832 as 'French Conditions'; the others—with literary sketches, reflections on the drama and art, poems, etc., as 'Salon' (4 vols. 1832-36). The persecutions which the German Diet (Bundestag) set in motion against the "Young Germany" school of writers, leading to the ban against their works, this act of mediævalism affected the poet deeply, and other unpleasantness was added thereto. His only compensation was his recognition in his fatherland, the esteem in which he was held in France, and the love of a beautiful young Frenchwoman, Mathilde Creszentia Mirat, whom he married in 1841, after having lived with her many years. Despite many storms and although his wife had no idea of her husband's eminence, the marriage was a happy one. The heavy material burden which she obliged Heine to assume, forced him in 1836 to receive from the French Government, when Guizot was head of the Ministry, a pension of 4,800 francs—a charity which France at that time bestowed on all prominent fugitives. It is to be understood, however, that Heine incurred thereby no obligation to praise or defend the political administration. Nevertheless, later he was violently attacked for this step.

His Illness and Last Works.—The death of his rich uncle from whom he received an annual sum of 4,000 francs threw him into a terrible state. He was not mentioned in the will, and anxiety was added lest his cousin Carl Heine would refuse the further payment of his stipend unless he would submit his writings to a rigid censure by the family. Violent conflicts followed that cost the poet his rest and his health, which last had long been undermined. A severe nervous trouble had tortured him from his youth, and now as added illness came paralysis of the eye.

In 1843-4 Heine visited his old mother in Hamburg. The poetical description of his journey in the winter tale 'Germany,' which appeared in 1846 with his 'New Poems,' and the epic poem 'Atta Troll,' which was issued in 1837, showed an entirely new line of poetical genius; for both these satirical epics are pearls of poesy. Since 1848 Heine was practically chained to his bed of illness—his famous "mattress grave." He bore his sufferings, however, with true heroism; his intellectual power was not weakened. But a great religious change took place which led him back through the Bible to belief in God and to the memories of his race. The two great works of the last period of his life, 'Romancero' (1851) and 'Confessions' (in Lutetia, 3 vols. 1854), are proofs of this great change, both in poetry and prose. Once more did the poet reveal himself to his admirers in agonizing strains of sorrow, in classical ballads, in Hebrew melodies, in profound lamentations of vivid effectiveness. Once more steps the great writer before us, and in prose of the loftiest beauty and strength he seeks to answer the most vital questions of our human existence.

On 17 Feb. 1856 he died after much suffering. He rests at Montmartre, next to his wife. His grave is adorned with a monument, the work of the sculptor Hasselriis. An artistic memorial was erected by an enthusiastic admirer, the late Empress Elizabeth of Austria, at her country palace Achilleion, near Corfu in the Ionian Sea, with its classic memories. The continued efforts, however, made to place a memorial to the poet in his home on the Rhine have so far been fruitless, and have but led to bitterest conflicts between clericals and anti-Semites on the one side, and the large body of his admirers on the other. It is not without significance that the Lorelei fountain which could find no lodgment in Germany, has been placed in New York, the metropolis of the United States, a country where Chas. G. Leland's translation of the 'Pictures of Travel' appeared in 1855, and where the poet's works have appeared in numerous editions and translations. The poet's body of admirers grows from day to day, and with this vast congregation of thoughtful men and women in every land the history of literature, judging without prejudice, gladly recognizes Heine as the greatest German lyric poet, after Goethe, and as one who is and will remain among the most illustrious poets in the world's literature.

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GUSTAV KARPELES,

Author of 'Jewish Literature and other Essays.'

Heinemann, hī'ne-man, William, English publisher and author: b. Surbiton 18 May 1863. He founded the publishing house which bears his name in 1890. He has published under the pen name of "KASSANDRA VIVARIA": 'Via Lucis'; 'The Garden of Olives'; 'The First Step,' a play (1895); 'Summer Moths,' a play (1898); 'War,' a play (1901).

Heinrich, H. H., American horologist: b. Granz, Germany, 1822; d. Brooklyn, N. Y., February 1903. He was apprentice to a Hamburg watchmaker, studied with Martin Zeller of Vienna, in Switzerland became a manufacturer of watches and escapements, and there taught for 10 years in a horological school which he had established. He became known as one of the foremost European chronometer-makers, came to the United States and finally set up in business for himself in New York. In 1880 his time-recording instruments excelled all others at the prize tests held in Washington. He also received highest awards from the expositions at Berne 1858, Paris 1889, and Chicago 1893.

Heintzelman, hint'sēl-man, Samuel Peter, American military officer: b. Manheim, Pa., 30 Sept. 1805; d. Washington, D. C., 1 May 1880. Graduated at the United States Military Academy 1826, and served during the Mexican War. In 1861 he commanded a division at Bull Run, where he was wounded 21 July. Afterward promoted brigadier-general of volunteers, Heintzelman, during the organization of the army in the winter of 1861-2, held command of a division. On the moving of the Army of the Potomac, in March 1862, the 3d Army Corps was placed under his command. His corps formed the right wing of Pope's army at the second battle of Bull Run 30 Aug. 1862. During the Maryland campaign he commanded the defenses at Washington, and was afterward appointed to the command of the Department of Washington, and of the 22d Army Corps, which he held during the battles of Chancellorsville and Gettysburg, in May and July 1863. He retired in 1869, with the rank of major-general.

Heir (Lat. *hæres*), in law, one entitled by descent and right of blood to lands, tenements, or other hereditaments. Hence it is an ancient apothegm, that "God only can make an heir." An heir is really one who is born or begotten in lawful wedlock, and on whom the law casts the estate, in lands, tenements, or hereditaments immediately on the death of his ancestor. The rights of heirs in most of the United States are determined by the principles of the common law unless specially modified by statute. It is a matter of judicial decision that the rights of heirs in the United States are statutory only. Hence they cannot plead, for instance, that an inheritance tax is unconstitutional. An heir presumptive is one who will be the heir at the death of the owner, as the elder son of a deceased brother in England, or all the children of a brother in the United States, where the owner has no children; for they will be heirs if he dies without issue. As an heir presumptive may lose his heirship by a change of circumstances, he does not become an heir apparent so long as this change is legally probably, though physically or naturally impossible. Thus the nephew of the owner can never be his heir apparent, however aged or feeble or near to death the owner may be; for in contemplation of law it is always possible that a son may be born to him, who would be an heir apparent, and who would therefore supersede an heir presumptive. An heir apparent is one who must be the heir if he survive the owner, as the eldest son in Great Britain, or all the children in the United States.

Heiss, his, Michael, American Roman Catholic prelate: b. Pfahldorf, Bavaria, 12 April 1818; d. Milwaukee 26 March 1890. He studied at the University of Munich and at the Catholic seminary at Eichstädt, and was ordained in 1840. In 1843 he came to the United States, and was first assigned to a church in Covington, Ky.; he next went to Milwaukee as missionary priest and secretary to the bishop. In 1868 he was consecrated as the first bishop of La Crosse, Wis.; in 1880 he was appointed coadjutor to the archbishop of Milwaukee, with the right of succession, and two years later became archbishop of Milwaukee. He has taken an important part in American councils, and was a member of the Vatican Council (1860-70). He has written:

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'The Four Evangelists,' and a treatise on marriage (in Latin).

Heistand, Henry Olcott Sheldon, American soldier: b. near Richwood, Ohio, 30 April 1856. He was graduated from West Point 1878, and was assigned to 11th United States infantry as 2d lieutenant. He was appointed government inspector and instructor Ohio National Guard in 1892, and during the presidential campaign of 1896 was confidential secretary to McKinley. He was promoted lieutenant-colonel in 1900, and became adjutant-general and chief of staff in the China expedition for relief of Peking 1900. He has written: 'Alaska, Its History and Description' (1898).

Hejra, or Hijra. See **HEGIRA**.

Helen, in Greek legend, the most beautiful woman of Greece, daughter of Zeus by Leda. By advice of Ulysses her numerous suitors were bound by oath to respect her choice of a husband, and to maintain it even by arms. She chose Menelaus, but was afterward carried off to Troy by Paris, the Trojan war arising from the claim made by Menelaus for the fulfilment of the oath. After the death of Paris she married his brother Deiphobus. On the fall of Troy she returned to Sparta with Menelaus, but at his death was driven from the country, and was murdered at Rhodes by the queen of that island.

Helena, hēl'ē-nā, **Saint**, the mother of the Emperor Constantine the Great. She was of humble origin, probably the daughter of an inn-keeper of Bithynia. She captivated Constantius Chlorus, and became his wife; but when Diocletian elevated him to the dignity of Cæsar, in 292 A.D. he was compelled to repudiate her. The succession of her son, and the influence she had exercised in educating him as a Christian, compensated her for previous humiliations, while her piety and zeal for the propagation of Christianity have made her a saint in the Roman Catholic calendar.

Helena, hēl'ē-nā or hēlē'nā, Ark., city, county-seat of Phillips County, on the Mississippi River, and on the St. Louis, I. M. & S., the Yazoo & M. V., the Arkansas M. R.R.'s., and is the terminus of the Arkansas Central; about 75 miles below Memphis and 95 east by south from Little Rock. It has boat communications with all important river-ports. A conflict between the Federal and Confederate forces took place here 4 July 1863. The Union army, about 4,500, was under Gen. Prentiss, the Confederate, about 9,000, under Gen. Holmes. The Confederate loss was about 1,800, including killed, wounded and prisoners. Helena is in an agricultural and lumbering region; the chief manufactures are lumber, cottonseed-oil, and foundry products. It has cotton-compresses, a shingle-mill, brick-yards, and large lumber-yards. Some of its educational institutions are the Jefferson High School, and the Sacred Heart Academy; it has a public library, nine churches, and three banks. Pop. (1910) 8,772.

Helena, Mont., city, capital of the State, and county-seat of Lewis and Clarke County; on the Northern Pacific and the Great Northern R.R.'s.; about 70 miles north by east of Butte. The city is surrounded on all sides by the Rocky Mountains; on the south and west the moun-

tains are within two miles of the city, while to the north there is a wide valley between the city and the foothills, and the same condition exists on the east. The city is protected from severe wind storms, and in the winter season there is a difference in temperature between the city and the mountain country of from 10 to 20 degrees. The country tributary to the city is rich in both mineral and agricultural resources. The mines are principally gold-producing, while the products of the farms are cereals and the ordinary vegetables. Tributary to the city are large areas devoted to the raising of cattle and horses, but this industry is gradually being replaced by diversified farming.

Helena is noted as the richest city per capita not only in Montana, but in the entire Rocky Mountain country. It is principally a city of homes; cattlemen, miners, and others engaged in industries elsewhere in Montana have their residence in Helena because of its church, school, and social attractions. It is the best built city in the State; its hotels, office buildings, mercantile establishments and private residences being equal to any found in cities of 100,000 in the east.

The geographical situation of Helena has made it a great distributing centre. Before the days of the railroads, when stage lines and freight wagons drawn by oxen were the only means of transportation, the geographical position of the city brought to it many travelers and great stores of merchandise. From Helena the people and the goods were distributed to other settlements. The Northern Pacific Railroad, the first to reach the city, following the trend of business, built branch lines from Helena, and thus it retained its commercial supremacy. Later the Great Northern was also extended to the capital city, and it likewise reached out for trade in the surrounding country by building branches. The original of Helena was "Last Chance Gulch"; the town came into existence as a result of discoveries of placer gold. The first discovery of gold was made in 1864, by four prospectors, John S. Cowan, John Crab, D. J. Miller, and Robert Stanley. These four men started early in the spring of 1864 from Alder Gulch, now Virginia City, in the southern part of the State, to search for placer gold. They went first to western Montana, and finding nothing there started east, prospecting the streams. They finally found what is now known as Prickly Pear Creek, running through the valley north of Helena, and here they discovered a few traces of gold, but they continued their journey north. Provisions becoming scarce they retraced their steps, intending to return to Virginia City, and again they came to Prickly Pear Creek where they noticed a little gulch. One of them said: "Boys, this is our last chance to strike it. If we do not find gold here we must strike straight for Alder." On 16 July 1864, they sunk two holes to bedrock, and in each they found gold. It was the "last chance" that turned out favorably, and that was the name of the camp until 30 October of the same year. The news of the find spread, and soon there were 500 men in the camp. At the meeting to name the town, Pumpkinville, Squashtown, Tomahawk, and Tomah were suggested. Finally John Somerville suggested Saint Helena. This was amended to Helena, and on a ballot Helena won by two votes over Tomah.

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The educational institutions are public and parish schools, the Montana Wesleyan University (M. E.), opened in 1890, Saint Vincent's Academy, and the State, city, and other libraries.

Among the principal buildings at Helena are the Government building, costing \$500,000; State capitol, costing \$400,000; the county courthouse, costing \$100,000; the high school building, costing \$150,000, and seven graded school buildings valued at \$200,000. There are also Saint John's Hospital, Saint Joseph's Orphanage, and several fine churches. Twelve miles from Helena, on the Missouri River, is located the plant of the Missouri River Power Company. This company furnishes electrical power for operating street cars and lighting the city of Helena, and for manufacturing purposes. It also transmits electrical power to Butte for use in the mines, a distance of 100 miles. Four miles from Helena is located the smelter of the American Smelting and Refining Company. The principal gold mine now operated in the vicinity of Helena is the Big Indian, located in a gulch four miles south of the city. Marysville is the largest mining camp tributary to the city. Here is located the Drum Lummon mine, owned by an English company, and in the near vicinity are other mines which are large gold producers.

In the 20 years after the opening of the "Last Chance Gulch," gold to the amount of \$25,000,000 was taken out of the gulch and the town grew to a city of 20,000 and became the capital of the State.

From the discovery of gold until 22 Feb. 1881, when the city government was organized under a charter from the State government, the government of the city was by a committee representing the merchants and bankers.

The government is now vested in a mayor, who holds office two years, and a council. The executive appoints, subject to the approval of the council, all the subordinate officials except the city treasurer and police magistrate, both of whom are chosen at a popular election. The assessed valuation of property is now about \$15,000,000.

Helena has been the capital of Montana since 1869. In that year the capital was removed by popular vote from Virginia City. After Montana was admitted as a State two elections were held for the permanent location of the capital, and in 1894 Helena was chosen. Its growth began rapidly to increase.

The altitude of Helena is 4,200 feet. The climate is not severe, the average temperature in January and February, the two coldest months in the year, being 20 above zero, with no moisture in the air. In summer the average temperature is 75. The growth of the city from now on may not be as rapid as in the early days; but it promises to be a healthy, steady development. Pop. (1910) 12,515.

CHARLES D. GREENFIELD.

Helena, Battle of. Helena, Ark., is on the west bank of the Mississippi River, about 82 miles below Memphis. Since 13 July 1862, when Gen. Curtis arrived there from western Arkansas, it had been occupied by Union troops, and on 4 July 1863, was held by a division of the Thirtieth corps, under Gen. Salomon, and a brigade of cavalry, in all 4,129 effective men, un-

der command of Gen. B. M. Prentiss. The place is surrounded by hills, and those nearest the city were occupied by strong redoubts; Graveyard Hill in the centre, Fort Righter on the north or right, and Fort Hindman on the south or left, were all connected by a line of bastions and rifle-pits, both ends of which rested on the river. In the river lay a gunboat. Toward the middle of June it was determined by the Confederates to take the place, whereby it was hoped to raise the siege of Vicksburg or, if Vicksburg fell, still to keep the river closed. Gen. Holmes was ordered to move from Little Rock with about 7,600 men, Price's and Marmaduke's divisions, Fagan's brigade of infantry, and Walker's brigade of cavalry. Holmes bivouacked about four miles from Helena on the evening of 3 July, and at midnight advanced to within a mile of the outer works. The assault was ordered at daylight. On the Confederate right Fagan with 1,770 men advanced on Fort Hindman, carried all the outer entrenchments, and made a desperate attempt to take the fort, but was repulsed with a loss of over 400 men. On the Confederate left, Marmaduke's division of infantry and Walker's cavalry brigade, aggregating 2,780 men, attacked Fort Righter and were repulsed. Price, in the centre, with 3,100 men, made a strong assault, carried all the entrenchments in his front, seized Graveyard Hill, and ordered one brigade to move on the town and another to assault Fort Hindman in the rear, but the Union troops checked the advance of the two brigades and drove them back and, the attacks on the right and left being repulsed, the fire of the forts, rifle-pits, and gunboat was concentrated on Price, and at 10.30 A.M. Holmes gave the order to withdraw, and led his troops back to Little Rock. The Union loss was 57 killed, 146 wounded, and 36 missing; the Confederate loss was 173 killed, 687 wounded, and 776 missing. Consult: 'Official Records,' Vol. XXII.; Greene, 'The Mississippi'; The Century Company's 'Battles and Leaders of the Civil War,' Vol. III.

E. A. CARMAN.

Hel'enin, a chemical substance extracted by hot alcohol from the root of the elecampane (*Inula helenium*). It has the formula $C_{15}H_{20}O$, and is nearly insoluble in water, but very soluble in alcohol. The first crystals obtained from the root-extract contain considerable quantities inulacanthor; but this may be removed by repeated crystallization from alcohol. Pure helenin crystallizes in white prisms or needles, melting at 232° F.

Helicidae, hē-līs'ī-dē, the family of terrestrial pulmonate mollusks which includes most of the land and many fresh-water snails. See SNAILS.

Heligoland, hēl'ī-gō-lānd, or **Helgoland**, hēl'gō-lānt (Dan. 'holy land'), a small island and popular sea-bathing resort in the North Sea, belonging to Germany, situated about 40 miles northwest of the mouth of the Elbe. It is about a mile long and one third of a mile broad, and has an area of about one quarter of a square mile. It consists of two parts, the Oberland, a flat-topped rock 206 feet high, affording a little soil for pasture and the growth of potatoes, etc., and communicating with the Unterland, a small stretch of shore at its foot, by 192 steps and an

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elevator. Most of the houses stand on the Oberland. The Unterland gives partial shelter to the shipping. Steamboats ply between the island and Hamburg. The principal buildings are the church, lighthouse, and a royal Prussian biological station for the study of the fauna and flora of the North Sea. The bathing facilities, which attract so many visitors, are found in a dune or sand-bank separated from the main island by a channel about a mile wide. This Sandy Island, as it is called, is slowly being reduced in size by the inroads of the sea. The inhabitants are chiefly employed in fishing, and speak a Friesian dialect. The island is well fortified, and has cable communication with Cuxhaven and Wilhelmshaven. Christianity was first preached here by St. Willibrod in the 7th century. Taken from the Danes in 1807, it was ceded to Great Britain in 1814, but was transferred to Germany in 1890. Pop. about 2,500, in the bathing season increased by several thousand visitors.

Heliocentric, hē'li-ō-sēn'trĭk, "having the sun as centre," a term applied to the Copernican system, as in opposition to the Ptolemaic system, which was geocentric, that is, "having the earth as centre" of the solar system. In modern astronomy the word is applied to calculations in which the sun is referred to as centre of the planetary system. Thus the heliocentric place of a planet is the position it would occupy at a given time when calculated from a point of view in the centre of the sun.

Heliodorus, hē-li-ō-dō'rūs, the earliest of the Greek writers of romance: b. Emesa, Syria, and lived near the end of the 4th century. He became a believer in the Christian religion, and bishop of Tricca in Thessaly. His youthful work, 'Æthiopica (that is, Æthiopic Affairs), or the Loves of Theagenes and Charicleia,' is a tale in poetical prose, with an almost epic tone. It is distinguished by its strict morality from the other Greek romances, and interests the reader by the wonderful adventures it recounts. One of the best editions is that of Hirschig in the 'Erotici Scriptores' (1856). An English translation by R. Smith appeared in 1855.

Heliogabalus. See ELAGABALUS.

Hellograph, an instrument invented by De la Rue for obtaining photographs of the sun. Also an apparatus for telegraphing by means of the sun's rays. See HELIOSTAT; MILITARY TELEGRAPH.

Heliogravure, hē'li-ō-grā'vūr. See PHOTOGRAVURE.

Heliometer, an instrument for measuring small distances on the sky, particularly the apparent diameters of the sun and of the moon. The heliometer of Bouguer is an astronomical telescope provided with two object-glasses, one of which is movable, and which form two distinct images of the same object, visible through the same eye-glass. A single object-glass cut into two parts, which are relatively movable by a screw, is always employed now. If, in contemplating a celestial body, the object-glasses are placed so as to bring the images to touch each other, the distance of the centres of the glasses gives the diameter of the image. In this manner the instrument gives, for instance, the difference of the diameter of the sun in perigee and apogee.

Heliopolis, hē-li-ōp'ō-līs ("City of the Sun"), Egypt, the On of the Hebrew Scriptures, on a site now partly occupied by Matarich, six miles northeast of Cairo, was one of the most ancient and extensive cities during the reign of the Pharaohs, and so adorned by monuments as to be esteemed among the first sacred cities of the kingdom. During the flourishing ages of the Egyptian monarchy the priests and scholars acquired and taught all the learning of the Egyptians within the precincts of its temples. It may be regarded as having been the university of the land of Misraim, and at the time of Strabo, who visited this town 24 B.C., the apartments were still shown in which, four centuries before, Eudoxus and Plato had labored during 13 years to learn the philosophy of Egypt. Solon and Thales were also reputed to have visited its schools. Here Joseph and Mary are said to have rested with the infant Jesus. Near the village stands the Pillar of On, a famous obelisk, supposed to be the oldest monument of the kind existing in Egypt. Its height is 67½ feet, and its breadth at the base 6 feet. Hieroglyphical characters are sculptured upon it, but are partly illegible. A fierce battle was fought here, 20 March 1800, between the French under Kleber and the Turks, when the latter were defeated.

Heliornithidae, hē-li-ōr-nīth'i-dē, a family of tropical birds, the fin-foots or sun-birds, placed by some ornithologists among the *Cecomorpha*, and by others, more probably, with the rails. They are about a foot long, mottled brown and white, with long pointed wings and long stiff tails; and frequent the borders of forest streams and ponds, in which they spend much of their time swimming and diving well. They feed on small fish, crustaceans, insects and seeds. The best-known species is *Heliornis fulica* of southern South America.

Helios, hē'li-ōs, in mythology, the god of the sun (Latin, *Sol*) in the Greek mythology: son of Hyperion and Theia, and brother of Eos (Aurora, the dawn) and Selene (Luna, the moon). He is frequently called by the name of his father. He dwells with Eos in the ocean behind Colchis. From the portals of the morning he rides through the air in an oblique curve to the gates of evening, and after having cooled his horses in the ocean, he drives his chariot into a self-moving golden vessel, made by Hephestus (Vulcan), which with wonderful rapidity bears him during the night along the northern shore of the ocean back to Colchis, where he bathes his horses in the lake of the Sun, and rests till the dawn of the morning. Other accounts represent him as making this nightly passage while slumbering in a golden bed. His horses and chariot are first mentioned in the Homeric hymn on Helios. Among events in the history of Helios the poets relate his contest with Poseidon for the Isthmus of Corinth, his revealing the secret amours of Ares and Aphrodite, and his disclosure to Demeter of Pluto as the ravisher of her daughter. This idea of his omniscience seems to have been the reason why he was confounded and identified with Apollo, though they were originally quite distinct. As he was descended from the race of the Titans he is often called Titan. The famous Colossus of Rhodes was a representation of Helios.

Helioscope is a telescope behind which the image of the sun is received upon a plane

HELIOSTAT — HELIUM

surface. An astronomical telescope is drawn out a little farther than is necessary for common use, and directed toward the sun, and the image which is formed is received in a dark place. For this purpose a dark chamber is employed, or the telescope is placed in a dark funnel-shaped enclosure, the bottom of which is covered with oiled paper or closed with ground glass, on which the sun's image is formed. Upon the paper or glass a circle is described equal to the image, and it may be divided by concentric circles into rings. With this instrument the spots on the sun, eclipses, etc., may be observed.

Helio-stat, hē'li-ō-stāt, an instrument used in optical experiments with sunlight for keeping a beam always falling in the same direction in spite of the motion of the sun. It consists of a mirror mounted equatorially, and carried round by clock-work in such a way as to neutralize the apparent motion of a beam of sunlight reflected from it. This instrument has been employed among other purposes as a means of signaling. A beam of light being directed to the point to which it is intended to convey the signals, the dot-and-dash alphabet is made use of by the device of exhibiting and obstructing the light for longer or shorter periods. A short flash represents one letter, a long flash another, a short quickly followed by a long a third, and so on. As adapted to this purpose the heliostat has received the name of heliograph.

Heliotherapy (Gk. *ἥλιος*, sun + *θεραπεῖα*, service), the treatment of disease by the action of sunlight. See **PHOTOTHERAPY**.

Heliotrope, hē'li-ō-trōp, a genus (*Heliotropium*) of plants of the borage family, characterized by the undivided ovary prolonged into a style, many of whose species have vanilla-scented blossoms. The one most in repute is a small shrub (*H. peruvianum*), originally South American, which has small fragrant flowers growing compactly together in the spikes. Cuttings taken from the young branches grow readily, and come soon into blossom. The *H. europæum*, or common heliotrope, is a flowering herb indigenous in the south and west of Europe. The heliotropes are natives of warm climates, and very numerous, several growing wild in the United States. Many delightful varieties have been produced as garden and greenhouse flowers.

Heliotrope, the bloodstone, is a variety of quartz partaking of the character of jasper and of chalcedony. It is of a deep green color, and is covered with red spots like drops of blood. Many fine antique Greek and Roman intaglios and cameos, also seal rings carved in bloodstone, are preserved in the great gem collections. It is found in Tartary, Persia, Siberia; in the island of Rum, Scotland, and many other places. It received the name heliotrope, or as some of the older writers give it, eliotropia, because it was said that if the mineral be put into water contained in a basin rubbed with the juice of the plant heliotrope, and be exposed to the sun, the water will appear red and the sun blood-like, as if it was eclipsed.

Heliotropism, hē'li-ōt'rō-pīzm, or **Phototropism**, the influence and effect of sunlight on organisms. When a seedling plant is placed in a transparent vessel of water within reach of

the light of a window, the stem and leaves gradually bend toward, and the roots from, the light. The former phenomenon is termed positive, and the latter negative, heliotropism. The shoots and leaves of nearly all plants turn toward the light, and the turning of the sunflower toward the sun is familiar to every one. In the case of organs which are positively heliotropic the growth of the side next the light is retarded, and that of the opposite side increased; the result of these combined actions is a concavity on the former, and a convexity on the latter, thus causing a curvature toward the light. In the case of roots these actions are reversed. That these results are brought about by the action of light is evident; the cells on the concave side become less, while those on the convex side become more, turgid, thus forcing the organ to bend; but the cause of turgescence is unknown.

In animals a similar heliotropism is operative and is plainly manifested in some low forms, as hydra, where it is of great service in their almost automatic food-getting. Heliotropism is closely allied to, and much modified by chemotropism (q.v.) and other influences.

Heliozoa, hē'li-ō-zō'ā, the "sun animalcules," an order of rhizopods (q.v.) with or without silicious skeletons, and having slender and radiant pseudopodia, stable and rarely interlaced. The majority live in fresh water, but some are marine. A common and widespread example is the genus *Actinophrys*.

Helium, a gaseous element, known to be present in the atmosphere and in certain minerals, and, like argon, characterized by a singular chemical inertness. The discovery of helium was a consequence of the discovery of argon, and on account of the close chemical, physical and historical relations of the two, reference should be made to the article **ARGON**, and to the references there given. Helium was known to exist in the sun many years before it was discovered upon the earth. During a total eclipse of the sun, in 1868, Janssen observed a brilliant yellow line in the spectrum of the solar chromosphere, very close to the D lines of sodium, and yet not identical with either of them. The new line was assumed to be due to a previously unknown element, and in the same year Lockyer proposed the name "helium" for this hypothetical element, from the Greek word "helios," meaning the sun. No evidence of the existence of helium upon the earth was adduced until 1882, when an Italian scientist named Palmieri announced that he had obtained the spectrum of helium from certain of the lavas given off by Mt. Vesuvius. He made no attempt to isolate the new body, however, and while it is quite possible that his observations were correct, he can hardly be credited with the actual discovery of helium. No further progress was made in this direction until 1895. When argon had been discovered, and its chemical inertness had been established, Mr. Miers, mineralogist of the British Museum, pointed out that the mineral cleveite (q.v.) had been shown to contain nitrogen gas, apparently in the free state, and made the suggestion that part of what had been assumed to be nitrogen might in reality prove to be argon. Professor William Ramsay examined the gas from this source, and found that while it undoubtedly did contain argon, it also

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showed a brilliant yellow line, which did not appear to coincide with either of the sodium lines, though it was very close to them. He sent a specimen of the gas to Sir William Crookes for a more careful examination, and Crookes promptly reported that the new line was identical with the helium line. It was therefore proved that helium, which had previously not been certainly known except as a constituent of the solar chromosphere, is also a terrestrial element. Subsequent study revealed the presence of helium in several other minerals. It is given off from cleveite when that mineral is heated to about 400° F. in an exhausted tube, or when the mineral is treated with sulphuric acid, or with acid sulphate of potassium. All the minerals which contain any considerable quantities of helium also contain uranium, yttrium or thorium. It is not certainly known whether the helium is chemically combined with the mineral, or whether it is merely occluded by it. The latter supposition would appear to be the more probable, judging from the chemical inertness of the gas, and from the fact (presently to be noted) that radium appears to be generating helium continuously. Certain observations upon the mineral fergusonite, however, appear to give some color to the hypothesis that the helium is present in a state of chemical combination. Helium has also been found in solution in the waters of certain hot springs.

The presence of helium in the earth's atmosphere was established by means of subjecting the apparently pure argon that had been obtained from this source to a process of diffusion through a series of porous partitions of baked clay. Helium, being much lighter than argon, diffuses far more rapidly, and a mixture in which the two gases exist together may be partially separated into its constituents in this manner.

Helium, when pure, has a density of only 1.98, that of oxygen being taken as 8. Its atomic weight cannot be directly determined, because helium has not yet been made to combine with any other substance, although it has been subjected to the same experimental attempts as were tried in the case of argon (q.v.). It has been found, however, that the ratio of the specific heat of the gas at constant pressure to the specific heat at constant volume is about 1.65, and this indicates that helium is a monatomic gas (see GASES, KINETIC THEORY OF), and that its atomic weight is about $2 \times 1.98 = 3.96$; the atomic weight of oxygen being taken as 16. It therefore has the smallest atomic weight of any of the known elements except hydrogen. The chemical symbol He has been assigned to helium, although, as has been already noted, no compounds of it have as yet been obtained.

Dewar thought he had liquefied helium at the temperature of melting hydrogen (about 436° F. below zero), but this was not confirmed by subsequent experiments, and it is now believed that the liquefaction of helium is a problem still reserved for the future. Its critical temperature is probably still nearer to the absolute zero than that of hydrogen, and for this reason the gas is well adapted for use in thermometers intended for the measurement of exceedingly low temperatures. It has, in fact, been used for this purpose with success, in studying the properties of hydrogen.

A most remarkable and previously unparalleled fact in connection with helium remains to

be recorded. It has been known for some time that helium occurs in cleveite, and in other minerals in which the newly discovered element radium is found; but whether this was to be regarded as a mere coincidence, or whether it has some actual physical and chemical significance, has been a subject of considerable discussion. The most striking experiment bearing upon this matter, is one that is due to Huggins, who caused the radiation from radium to pass through a spectroscope provided with a quartz prism, and to fall upon a sensitive photographic plate. Upon developing the plate after a prolonged exposure, he found that cold radium gives a line spectrum when treated in this manner; and he made the further discovery that nearly all of the lines in the spectrum so obtained are apparently coincident with lines in the spectrum of helium. The full significance of this fact is not yet known; but when taken in connection with the observations of Soddy and Ramsay, which indicate that helium occurs in the gaseous emanation that is given off by radium, it is considered by no means impossible that we have here an instance in which one element is being slowly but continuously transformed into another one. If this inference is corroborated by future experiments, it will throw an altogether new light upon the nature of the chemical elements, and upon their relation to one another. The case is the more noteworthy, since helium has a smaller atomic weight than any other element save hydrogen, and radium has a greater atomic weight than any other element save uranium and thorium. Radium, moreover, appears to be metallic in nature, while helium, by its chemical inertness, resembles nitrogen.

Helix, hé'líks, a curve generated by winding a line around in a coil of gradually increasing radius. (1) In anatomy, a prominent and incurved margin surrounding the thinner and larger portion of the pinna in the ear. (2) In architecture, the small volute under the abacus of a Corinthian column. Of these there are in every perfect capital 16: two at each angle, and two meeting under the middle of each face of the abacus. (3) In geometry, a curve the tangents to which make, with the horizontal plane, a constant angle. The edge of the path of a screw is a helix, as is also the path described by any point of the surface of the thread when moved in the nut. (4) In zoology, the typical genus of the snail family. See SNAILS.

Hell (A. Saxon, *hel*, from *helan*, to cover), signifies originally the covered or invisible place. In the Bible the word is used to translate the Hebrew *Sheol* (grave or pit), and *Gehenna* (properly the valley of *Hinnom*), as well as the Greek *Hades* (the unseen). In the Revised Version of the New Testament, hell is used only to translate *Gehenna*, *Hades* being left where it stands in the Greek. In common usage hell signifies the place of punishment of the wicked after death, its earlier meaning being lost. The distinctive Scriptural term for the place of future punishment of the wicked is *Gehenna*. The belief in a state of punishment after death for the finally impenitent is held by almost all sects of Christians, as an analogous belief in the future punishment of unexpiated guilt is a tenet of nearly all religions ancient or modern. The nature of the punishment of hell, its locality, and

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its duration, have given rise to interminable controversies among Christian writers. The early Christian writers sometimes apply the word hell to a place of temporary purgation, in which the soul is freed from the stains of guilt contracted on earth preparatory to its enjoying the pure bliss of heaven. In this sense it corresponds in some degree with the Roman Catholic purgatory, and with the pagan idea of purification, as illustrated by Virgil in the sixth *Æneid*. Sometimes it is applied to the place of waiting of the just under the old law, till the coming of Christ should secure for them the completion of their reward; sometimes to the place where unbaptized children are detained because of unremitted original sin; and more frequently to the place of final and everlasting punishment for impenitent sinners. As to the locality of the scene of final punishment none at the present day makes a formal declaration. The terms above and beneath, as applied to heaven and hell, are merely relative, and though conventionally accepted convey no information. The Churches are not fully agreed as to the nature of hell-punishment. The prevailing idea among modern theologians is that the "fire" and the "worm" are significant emblems to give us the most correct and living conceptions of the reality that we can possibly attain in our present circumstances. They are fit emblems of anguish, and as such had laid hold of the Jewish imagination in connection with the word Gehenna, the term used in Mat. v. 22, 29, 30; Luke xii. 5. Gehenna, unlike Sheol and Hades, has never any intermediate signification, but is invariably applied to the place of punishment of the wicked after death. See IMMORTALITY.

Hell Gate, a narrow part of the East River between Long Island and Manhattan and on the east and west sides of Ward's Island. The passage between Ward's and Randall's Island is called Little Hell Gate. The rocks which were in Hell Gate were of such form and so situated as to make navigation dangerous, and the difference in the times and heights of the two tides which enter East River increased the dangers. The East River receives at one extremity the Sound Tide and at the other the tide from off Sandy Hook. "One sailing vessel out of every fifty" was the proportion damaged seriously when trying to pass through the channel between the reefs. Much had been said and written about the necessity of doing something to remove or at least lessen the dangers of Hell Gate, and officials of the United States navy, Lieutenants Davis and Porter, made a survey of Hell Gate in 1848. They reported the necessity of making the channel safe, and suggested the destruction of some of the most dangerous rocks; but nothing was done until the year 1851, when the work of destroying the rocks was begun. The process used was that of surface-blasting introduced by Maillefert. A portion of some of the rocks was removed, but this method of overcoming the dangers to navigation was found practically useless. In 1866 another survey was made by Brevet-Maj.-Gen. John Newton of the United States Engineer Corps, and in 1867 he submitted his report, in which he advised the removal of the reefs—the work to be done by blasting, and the drilling

of the surface to be made from a fixed platform. Soon after the work of making Hell Gate safely navigable was resumed and placed in charge of John Newton. For the work Newton invented a steam-drilling cupola scow, which served as a transport and a working platform from which the drilling-engines were operated. The new machine proved satisfactory. A new system of explosion had to be devised in order to protect Ward's and Randall's Islands and Astoria. Diamond, Coenties, and Ways reefs were removed, also Pilgrim Rock, before operations were begun on Hallet's Point Reef. The last mentioned was an obstacle to both large and small vessels. The excavations, begun in October 1869, were completed in June 1875. The drilling was completed 25 March 1876. The area operated upon was about three acres. The method of explosion was most successful. No damage was done to the windows of buildings near; it had no perceptible effect on the air, but little on the water, and the underground shock was slight, but was perceptible on Manhattan and the western part of Long Island. The removal of Flood Rock, which was in the middle of Hell Gate, made the navigable capacity of the channel more than double. The work of removing this most formidable obstruction was begun 7 June 1875. Lack of funds caused delay, and the explosion did not take place until 10 Oct. 1885. For the removal of Flood Rock about nine acres were tunneled and drilled; and the aggregate length of the tunnels was 21,670 feet, and of the drill-holes, 113,102 feet. The object sought to be gained by removing the rocks and reefs was to make a channel of the uniform depth of 26 feet and of sufficient width for the largest steamers. The work as planned and designed by Gen. Newton has not been completed (1904).

Helladotherium, hĕl'ă-dō-thĕ'rĭ-ŭm, an extinct genus of giraffes, found fossil in the upper Miocene (Pikermi) rocks of Attica. Its body was about as large as that of the existing giraffe, but the legs were of nearly equal length, and the skull was hornless.

Hellas, hĕl'as, the abode of the Hellenes, was first a town, and afterward, under the name of Phthiotis, a district in Thessaly. The ancients applied this name to the whole of Thessaly. With the spread of the Hellenic people the term embraced a gradually increasing territory, till it came to denote the whole of Middle Greece, and then the whole of Greece, with its islands and colonies. The Hellenes received this name in the belief that they were descended from Hellena, a mythical personage, a son of Deucalion and Pyrrha, or, according to others, of Zeus and Dorippe, and the father of Æolus, Dorus, and Xuthus, was said to have been king of Phthia. See GREECE.

Hellbender, a large salamander (*Cryptobranchus alleganiensis*) found chiefly in the streams emptying into the Great Lakes and those draining the western slope of the Appalachian Mountains. The hellbender is an ugly looking but perfectly harmless creature from 18 to 24 inches long; with the head and body much flattened and a prominent wrinkled fold of skin along the sides. Although entirely aquatic, no gills are present in the adult, and only a single pair of small pores represents the

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gill-clefts; the lungs are simple sacs. The limbs are functional, the anterior with four, the posterior with five digits, and the tail is provided with a wide fin. A wide mouth with teeth in both jaws, very small eyes and a slimy skin of a deep mottled brown color are further external characteristics. The giant salamander (*Megalobatrachus maximus*) of Japan is the only known closely related form. The hell-bender is a sluggish animal, active chiefly at night, when its voracity causes great annoyance to fishermen whose bait and fish it devours. It is extremely tenacious of life, and hibernates during cold weather. Although very common, its breeding habits are yet unknown.

Hellebore, a genus (*Helleborus*) of the crowfoot family (*Ranunculaceæ*), consisting of perennial erect herbs with scanty, palmately divided leathery leaves, and yellowish, greenish, or white terminal flowers. They are of interest on account of their poisonous and medical properties. About 10 species are natives of Europe and Asia, one of which (*H. viridis*) has become naturalized in the eastern United States. The Christmas rose (*H. niger*) is the source of the black hellebore of modern pharmacopœias, but the ancient black hellebore, a famous remedy for insanity, was probably obtained from other species. *H. viridis* and *H. fatidus* have emetic and purgative properties, and the latter, which is poisonous, has become a common introduced weed along the eastern American seaboard. These plants are closely allied to the aconites.

WHITE HELLEBORE is a very different plant, a species (*V. album*) of the genus *Veratrum* of the lily family, which contains several poisonous plants allied to colchicum. They are profusely leaved tall herbs growing in rich woods, and their roots contain the peculiar alkaloids veratroidin and jervin, to which their poisonous properties are mainly due. North America has a widespread species in the Indian poke (*V. viride*), which, like the European species, enters into the pharmacopœia, while its rootstocks are ground into the powder used as an insecticide.

Hellenes, hēl'ēnz, a native name for the ancient Greeks.

Hellenists, a name given the Jewish colonists who settled in Egypt after the destruction of the kingdom of Judah, about 600 B.C. Their number was increased by the many colonies of Jews planted by Alexander the Great (336 B.C.), and later by Ptolemy Lagus. Under the reign of the Emperor Augustus they amounted to nearly 1,000,000. They laid the foundation of a new epoch of Græco-Jewish literature, which, from its prevailing character, received the name of the Hellenistic. The Alexandrian Jews were the most influential in developing Hellenizing tendencies, and to them chiefly is to be referred the formation of the peculiar dialect termed the Hellenistic. In their literature the systems of Pythagoras and Plato were strangely combined with those Oriental phantasies which had been reduced to a system in Egypt, and with which the mystical doctrines of the Gnostics were imbued. The most noted Jewish Hellenistic philosopher was Philo of Alexandria, and the chief of the learned labors of the Alexandrian Jews was the Greek translation of the Old Testament.

Hellespont, hēl'ēs-pōnt. See DARDANELLES.

Hellgrammite, hēl'gra-mīt, the large black aquatic larva of the insect *Corydalus* (q.v.), much used as bait for black bass and other game fish. It lives in streams, preying upon smaller animals, and just before pupation crawls under large stones, where it can be found at about the same time as the bass are biting. It is also called "Dobson" after a maker of artificial baits.

Helm, Israel, Swedish colonist in America: b. 1615; d. 1695. He settled on the Delaware River, in 1649; was collector of customs at Philadelphia 1659, and became a member of Captain Carr's council 1668. He was chief interpreter between the colonists and Indians, and rendered valuable service at the meeting of the New Jersey Indians, Governor Andros, and the Swedish authorities, in 1675.

Helmet-shell, a large gasteropod of the genus *Cassis*, family *Cassidæ*. Most of the species inhabit tropical shores, but a few are found on the coast of the Mediterranean. The shells of *C. rufa*, *C. cornuta*, and *C. tuberosa* (the queen conch), are the material on which shell cameos are usually sculptured.

Helmholtz, Hermann Ludwig Ferdinand von, hēr'mān lood'vig fēr'dē-nānd hēlm'hōlts, German scientist: b. Potsdam 31 Aug. 1821; d. Charlottenburg 8 Sept. 1894. He studied medicine in Berlin, and received the appointment of assistant-surgeon in the Charité Hospital there in 1842. Next year he went to Potsdam as a military surgeon, but in 1848 he returned to Berlin to assume the duties of teacher of anatomy at the Academy of Art and assistant in the Anatomical Museum. He was called to the chair of physiology at Königsberg in 1849, and six years later went to Bonn as professor of anatomy and physiology. In 1858 he was appointed professor of physiology at Heidelberg, whence he returned in 1871 to Berlin as professor of physics. In 1888 he was appointed to the post of president of the new Physikalisch-Technische Reichsanstalt (Imperial Physico-Technical Institute) in Charlottenburg. Helmholtz was distinguished alike in physical science, in mathematics, and in physiology; but his most valuable and most original work was done in those departments of physics which stand in intimate relations with physiology, especially acoustics and optics. He had an eminently philosophical mind, and his works are no less valuable for their masterly exposition of the methods of experimental science than for the important results contained in them. His scientific fame was securely established as early as 1847, when he published 'Über die Erhaltung der Kraft' (On the Conservation of Energy). This subject was pursued further in 'Über die Wechselwirkungen der Naturkräfte' (On the Interactions of Natural Forces) (1854). His greatest works are the 'Handbuch der Physiologischen Optik' (Handbook of Physiological Optics) (1856-66); and 'Die Lehre von den Tonempfindungen' (1862; 5th ed. 1896), translated into English by Ellis under the title 'Sensations of Tone as a Physiological Basis for the Theory of Music' (1875). A collection of 'Vorträge und Reden' reached a fourth edition in 1896, and has been translated into English as 'Popular Lectures on Scientific Subjects' (1873-81). An edition of his scientific treatises was pub-

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lished at Leipsic in three volumes (1882-95), and in 1897 his 'Lectures on Theoretical Physics' appeared in one volume. In his 'Beschreibung eines Augenspiegels' (1851) he described the ophthalmoscope he had recently invented. In 1883 he was ennobled by the German emperor.

Hel'mont, Jan Baptista van, Flemish physician and chemist: b. Brussels 1577; d. near Brussels 30 Dec. 1644. He devoted his attention to scientific research, and although he put forth some visionary theories on the constitution of man, and on diseases, made some genuine discoveries in chemistry. He was probably the first to introduce the term 'gas' into science, and was the earliest observer of the acid reaction of the gastric juice. He published 'Ortus Medicinæ' (1648); and 'Opuscula Medica Inaudita' (1644), works which still possess interest for students.

Hel'muth, William Tod, American physician: b. Philadelphia 30 Oct. 1833; d. New York 15 May 1902; graduated Homeopathic Medical College, Philadelphia, 1853; Hahnemann College, San Francisco, 1866. In 1877 he became professor of surgery and dean of the New York Homeopathic College and Hospital. He was an officer in numerous medical associations and a member of the Société Médicale Homeopathique of France. Among his published works were: 'Treatise on Diphtheria'; 'Medical Pomposity'; 'System of Surgery'; 'Scratches of a Surgeon'; 'Suprapubic Lithotomy.'

Heloderma, hē-lō-dēr'mā. See GILA MONSTER.

Heloïse, ā-lō-ēz, or **Eloise**. See ABELARD.

Helots, hē-lōts, were the lowest of the four classes into which the population of ancient Sparta was divided. They are generally supposed to have been the aboriginal population of the country, and to have been reduced to bondage by their Dorian conquerors, their numbers being swelled from time to time by the addition of peoples conquered in war. The name is generally derived from the town of Helos, the inhabitants of which were carried off and reduced to slavery by the Heraclidæ about 1000 B.C., though a more probable derivation is the Greek *helein*, to take, making the name signify captives. They were the property of the state, which alone had the disposal of their life and freedom. The state assigned them to certain citizens, by whom they were employed in private labors, though not exclusively, as the state still exacted certain services from them; and they were attached to the soil—that is, each citizen received the number that belonged to his allotment, without any power to sell or free them. Agriculture and all mechanical arts at Sparta were in the hands of the Helots, since the laws of Lycurgus prohibited the Spartans from all lucrative occupations. But the Helots were also obliged to bear arms for the state, in case of necessity. Their dress, by which they were contemptuously distinguished from the free Spartans, consisted of sheep's skin and a leather cap of a peculiar shape. They were sometimes liberated for their services or for a sum of money; but they were not admitted to the full dignity of citizenship. In 424 B.C. 2,000 of the Helots, who had conducted themselves with distinguished bravery in war, were treach-

erously put to death. They several times rose against their masters, but were always finally reduced.

Helper, Hinton Rowen, American author: b. near Mocksville, N. C., 27 Dec. 1829; d. Washington, D. C., 9 March 1909. He published in 1857 'The Impending Crisis of the South,' which the Republican party used as a campaign document with great effect. Later works by him are: 'The Three Americas' Railway' (1881); 'Nojogue' (1867); 'The Negroes in Negroland' (1868); 'The Land of Gold.'

Helps, Sir Arthur, English essayist and historian: b. Streatham 10 July 1813; d. London 7 March 1875. He was educated at Eton and Cambridge; became private secretary to Lord Monteagle as chancellor of the exchequer, and was afterward commissioner of French, Danish, and Spanish claims. In 1860 he was appointed clerk of the privy council, and held this post till his death. He was created K.C.B. in 1872. As an essayist he was one of the most popular writers of his day, and his historical works had an extended reputation. He possessed very wide and general culture and sound judgment, was painstaking and accurate in details, and in his historical works displayed considerable breadth of view. His principal works are: 'Thoughts in the Cloister and the Crowd' (1835); 'Essays Written in the Intervals of Business' (1841); 'Friends in Council' (1847-57); 'Conquerors of the New World and their Bondsmen' (1848-52); 'Companions of my Solitude' (1851); 'History of the Spanish Conquest of America' (1855-61); 'Oulita the Serf, a Tragedy' (1858); 'Life of Pizarro' (1869); 'Realma' (1869); 'Casimir Maremma' (1870); 'Brevia, Short Essays and Aphorisms' (1870); 'Life of Hernando Cortes and Conquest of Mexico'; 'Thoughts upon Government' (1871); 'Life and Labors of Mr. Brassey' (1872); 'Social Pressure' (1874).

Helsingfors, hēl'sing-fōrs, Russia, a seaport town, capital of Finland, on a small peninsula in the Gulf of Finland, 180 miles by rail west-northwest of St. Petersburg. It is defended by the fortress of Sveaborg about three miles distant, and is the residence of the governor of Finland, the seat of important courts and public offices. Its university, removed from Abo in 1827, has a library of over 190,000 volumes. There are manufactures of linen, sail-cloth, tobacco, etc., and an important trade is carried on. Pop. about 94,000.

Helvetic Republic, the designation of the republic established in Switzerland by France in 1798. See SWITZERLAND.

Helvetic Confession, the name of a document drawn up by Martin Bucer in 1536 to settle the controversy between the Lutherans and the Zwinglians; and also of one drawn up by Bullinger (1566) at the request of Friedrich III., elector of the Palatinate, and adopted in Switzerland, the Palatinate, France, Hungary, Poland, and Scotland.

Helvetii, hēl-vē-shī-i, a former Gallic or Celtic nation living between the Rhone and the Rhine, the Jura, and the Rhetian Alps. They were more numerous and warlike than the neighboring Gallic tribes. They first appear in history 107 B.C., but were not known to the Romans until the time of Julius Cæsar, who, as governor of Gaul, prevented their intended emigration, and



HERMANN LUDWIG FERDINAND VON HELMHOLTZ.

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HELVETIUS—HEMIPODE

after many bloody battles, in which even the Helvetic women fought, pressed them back within their frontiers. The story of their meditated irruption into and seizure of southern Gaul is circumstantially related in the First Book of the Commentaries of the Roman general, who not only repulsed them with terrible slaughter, but almost exterminated them. Not a third of those who left their homes on this ill-fated expedition ever returned. Helvetia, which was less extensive than the present Switzerland, was divided into four districts, which had an entirely democratical constitution. Cæsar subjected the country to the dominion of the Romans, who established several colonies there. After the death of Nero, the Helvetii, for refusing to acknowledge Vitellius as emperor, were mercilessly punished by Cæcina, one of his generals, and thenceforth they almost disappear as a people.

Helvétius, Claude Adrien, klöd ä-drē-ouñ ěl-vä-sē-ūs, French metaphysician: b. Paris Jan. 1715; d. there 26 Dec. 1771. At the age of 23 he obtained the lucrative post of farmer-general, where he was distinguished by his mildness and indulgence from his colleagues, whose base practices filled him with indignation. He therefore resigned his office, and purchased the place of *maire d'hôtel* to the queen. Aspiring after literary fame he first directed his efforts to mathematics, then attempted to rival the dramatic fame of Voltaire by writing a tragedy. In 1758 he published 'De l'Esprit,' the materialism of which drew upon him many attacks. It was condemned by the doctors of the Sorbonne, and publicly burned in accordance with a decree of the Parliament of Paris. Helvétius went in 1764 to England, and the year afterward to Germany, where Frederick the Great and other German princes received him with many proofs of esteem. A complete edition of his writings was published at Paris in 1795.

Hem'ans, Felicia Dorothea Browne, English poet: b. Liverpool 25 Sept. 1793; d. near Dublin, Ireland, 16 May 1835. She displayed the bent of her genius when a mere child, and wrote some tolerable poetry in her 9th year. She first appeared as an author, in 1808, in a volume entitled 'Early Blossoms,' but it was subjected to harsh criticism, which she took very seriously to heart. A second volume, published in 1812, 'The Domestic Affections,' was much more successful. The same year she married Captain Hemans, from whom she was separated in 1818. She then resumed her literary pursuits, made herself acquainted with Latin and modern languages, and wrote much in the periodicals of the time. At the suggestion of Reginald Heber, afterward bishop of Calcutta, she wrote a tragedy entitled 'The Vespers of Palermo,' which, owing partly to Sir Walter Scott, who wrote an epilogue for it, was favorably received at the Edinburgh theatre, though it had previously, in 1823, proved unsuccessful at Covent Garden. Before this time she had added greatly to her popularity by her poems entitled 'The Restoration of the Works of Art to Italy'; 'The Skeptic'; 'Modern Greece'; and 'Dartmoor.' Later works were 'Lays of Many Lands'; 'Forest Sanctuary'; 'Records of Woman'; and 'The Songs of the Affections' (1830). She visited Sir Walter Scott at Abbotsford, and Words-

worth at Rydal Mount, and left with each the impression of a singularly graceful and gifted woman. Her poetry is essentially lyrical and descriptive, and is always sweet, natural, and pleasing. In her earlier pieces she was imitative, but she ultimately asserted her independence, and produced many short poems of great beauty and pathos. Mrs. Hemans had no dramatic power, her effusions being always intensely subjective.

Hem'atin, or Hæmatin. See HÆMOGLOBIN.

Hem'atite, native sesquioxide of iron, Fe_2O_3 , a mineral widely distributed, and constituting a valuable ore of iron. It crystallizes in the rhombohedral system, and also occurs in massive form, sometimes forming beds of great thickness. It has a hardness of from 5.5 to 6.5, and a specific gravity ranging from 4.9 to 5.3. It is usually dark gray or black in color, with a metallic lustre, and is sometimes slightly magnetic, occasionally even showing magnetic polarity. Hematite occurs in the rocks of every age. The extensive masses that occur in metamorphic rocks are believed to have been deposited, originally, in marshes, undergoing metamorphosis at the same time as the rocks with which they are now associated. Fibrous and columnar forms of the mineral, brownish-red or black in color, are also known, and to these the name 'red hematite' is sometimes applied. In crystalline and metamorphic rocks a variety known as 'specular iron' is met with, which is distinguished by the presence of crystals having a splendent lustre. Hematite occurs in vast quantities in various parts of the United States, notably in upper Michigan, in the Marquette district, and in Menominee and Gogebic counties; in Northern Wisconsin; and in St. Louis County, Minnesota. Iron Mountain, Missouri, is a hill about 200 feet high, the surface of which consists of loose blocks of hematite, many of which weigh as much as 10 or 20 tons. The name 'hematite' is from a Greek word signifying 'blood,' and was given to the mineral by the ancients from its fancied resemblance to coagulated blood. Hematite is sometimes called 'bloodstone' at the present time, though that name is more properly applied to a green variety of quartz, which contains small spots of red jasper. An allied mineral, consisting of hydrated sesquioxide of iron and known to mineralogists as limonite, is often popularly called 'brown hematite.'

Hemianæsthesia, hēm-i-ān-ēs-thē-sī-ā, loss of sensation on one half of the body, right or left.

Hemiplegia, hēm-i-plē'jī-ā (lit. 'half a stroke,' that is, of paralysis), paralysis of one side of the body. It is usually caused by hemorrhage in the brain cavity, commonly known as apoplexy; often a local accumulation of serum, or a tumor is the cause. The paralysis falls on the side of the body opposite to the lesion in the pyramids of the brain, unless the lesion occurs below the decussation of brain fibres. The treatment of hemiplegia requires the services of a physician. It is amenable to timely remedies, and a cure is generally obtained after the first attack, if it result from apoplexy; but the patient is liable to subsequent attacks.

Hem'ipode. See BUTTON-QUAIL.

Hemiptera, hē-mīp'tē-rā, an order of insects. It contains two leading groups, the *Homoptera* and *Heteroptera*. In the former the two pairs of wings when present are applied in rest pent-house fashion to the sides of the body. Several families are wingless. Cicadas, plant-lice (*Aphis*) and the like come here. In the second group the wings, when at rest, placed horizontally across the body, the second pair covered by the upper, which are *hemielytra*, that is, the basal half is leathery, the distal portion membranous. See BUG.

Hemlock, one of various plants. (1) A highly poisonous umbelliferous herb of the genus *Conium*, one species of which is European and the other African. The well-known official European one (*C. maculatum*) has become extensively naturalized as a weed in the United States. It is easily recognized by the wavy, crenate ridges of its short, laterally compressed fruit, and also by the disagreeable mouse-like odor when bruised (see *CONIUM*). (2) The water hemlocks or cowbanes of the closely allied genus *Cicuta*, which is also both European and American. The common American species is *C. maculata*, which grows in swamps and wet places, and is also dangerously poisonous, especially in its turnip-like cavernous root. See *CICUTA*.

Hemlock-spruce, an American coniferous tree of the genus *Abies* (or *Tsuga*) of which two species are recognized, the common northern one (*T. canadensis*), and a lesser one of the Southern Alleghenies (*T. Caroliniana*). The wood is too soft, weak, and brittle to be of extensive use as lumber, but the bark is of great importance in tanning. See FIR.

Hemlock, Water. See **HEMLOCK**.

Hem'meter, John Cohn, American physician: b. Baltimore, Md., 25 April 1864. He studied at the Royal Gymnasium, Wiesbaden, Germany; Baltimore City College; and University of Maryland; and became clinical professor of medicine in the last named institution, and director of the clinical laboratory. He is associate editor of 'Archives for Digestive Diseases,' Berlin, and author of: 'The Special Pathology and Treatment of Diseases of the Digestive Organs' (1896); 'Diseases of the Stomach' (1897); 'Diseases of the Intestines' (1901); 'Theodore Billroth, a biography' (1900). He is also a composer, and has composed 'Hygeia' (cantata); 'Prelude and Choral Music to the 23d Psalm' and other works.

Hem'orrhage. See **BLEEDING**.

Hemp. The hemp plant proper, or "common hemp," is *Cannabis sativa*, an annual shrub belonging to the *Urticaceæ*. The term hemp, however, is used to designate many other kinds of fibre which are in no way related to the species of common hemp, such as Manila hemp, from a plantain, sisal hemp from an agave, bow string hemp, from a liliaceous plant, and 30 or more other kinds. The different kinds of common hems are also specially designated, with prefixes, as Breton hemp, Piedmontese, Russian, English, China, and Japanese hems, and many others, some of these being trade names, or the names of varieties. The hemp plant proper is a native of that part of Asia which includes India and Persia, though, like flax, its culture has been extended to many portions of the

world in both temperate and tropical climes. It was used by the Scythians 2,500 years ago, and it was probably known to the Chinese and Europeans many centuries earlier. The Romans used it for sails and cordage, but not until after the dawn of the Christian era. It grows wild in many parts of India, where it is regarded more for its product known as chang or hasheesh than for its fibre. It flourishes on both the east and west coasts of Africa, and has been naturalized in Australia, as well as in several South American countries. In Europe it is cultivated chiefly in France, Italy, Germany, and central and southern Russia, and it will grow in Great Britain and Sweden. The plains of Hungary are peculiarly adapted to its culture. It is a favorite textile in China and Japan, the fibre from the last named country being particularly strong and fine, and at the same time, better prepared than many European hems. The plant is an annual shrub, the fibre being produced in the bark of the straight stiff stalks or stems, and is therefore a bast fibre. In the experiments of Roxburgh and others, Russian hemp is taken as the standard of comparison for all other fibres. The stems vary from 3 to 20 feet long, dependent upon the variety and the soil in which grown. The best kinds have a hollow stem, the wood of which breaks down readily when cleaned for the fibre. While hemp is produced commercially in very few localities of the United States, it will thrive from ocean to ocean, and from the Gulf to Canada. Its cultivation as a fibre crop is confined chiefly to Kentucky, Illinois, Missouri, Nebraska, and California, though considerable hemp, in past time, has been produced in New York. Lately it has been experimented with in the South, notably in Mississippi and Texas. The bulk of the crop is grown at the present time in Kentucky and California.

The Kentucky hemp industry is very old, for the fibre was cultivated in the early part of the last century. The annual production, in 1859, reached a total of 75,000 tons, but 20 years later it had fallen off to such an extent that 5,000 tons only were recorded for the entire country. Since that time it has fluctuated between 5,000 and 12,000 tons as the total crop of the country, the annual production at the present time being less than the smaller figure. In late years the price has ruled at about 3½ cents per pound, though now it is quoted at 4½ cents. American hemp was at one time used to some extent for the rigging of vessels, although its largest use was for bagging. As early as 1824 it was employed in the navy, and efforts were made later by the government toward the production of better grades of hemp by water retting. The fibre has also been used for twines, and for woven fabrics. In late years the demand has been largely for a low grade fibre that could be manufactured into binder twine, though the bulk of the binder twine is made from manila and sisal. Very recently there has been a demand for a better grade of fibre, which has resulted in more careful methods, particularly on the Pacific coast, where a fibre has been produced fit for fine twines and cordage. Kentucky, Illinois, and Nebraska hems are coarse, dark in color, and are not carefully prepared, which is the reason for the low price of 3½ cents against 8 and 10 cents per pound for finer imported hems. The best hemp comes from Italy,

chiefly, from the provinces of Bologna and Ferrara, the fibre being very white, very well prepared, and of superb strength. Breton hemp from France is almost as good, but rarely imported. Russian comes in several grades, some light, but not as light as the Italian, some dark like the native fibre, and low in grade. Some good hemp comes from Austria-Hungary, and a trifle from other portions of Europe. Little if any of the Japan fibre reaches this market, though the best Japanese is as good as the Italian. We consume annually less than 10,000 tons, including both the native and imported.

There are many varieties of the hemp plant, four or five having been grown in the United States, though it is said that the bulk of the seed at present sown is the China hemp and a Japanese variety. Five varieties are cultivated in Europe, a common form reaching a height of 5 to 7 feet; Piedmontese or Bologna, an Italian variety that averages 12 feet in height; China hemp, introduced in 1846; a small hemp found in the valley of the Arno, and around Tuscany, and Arabian hemp, cultivated for the resinous principle or drug.

Limestone soils and the alluvial soils of the river bottoms are best adapted to hemp culture, and the seed bed should be almost as carefully prepared as for flax. One to three bushels of seed are sown per acre broadcast, and lightly covered. The planting, in Kentucky, usually begins in April, and the crop may be harvested in 100 days. For further particulars regarding the culture and preparation of this fibre, see Special Reports Nos. 1, 8, and 11, office of Fibre Investigations of the Department of Agriculture, and Hemp Culture in the United States, Year-book of Agriculture for 1901. See also the 'Dictionary of the Economic Products of India.'

While some 300 patents have been issued in this country for hemp machines, the bulk of the fibre is extracted by means of the old-fashioned, clumsy wooden "slat brake" that has been employed from time immemorial and without improvement or change. With one of these brakes a Kentucky negro can extract perhaps 150 pounds of fibre in a day. The brakes used in European hemp countries are little better, though they are smaller and less clumsy. The best foreign hems are water retted, the stalks dried with great care, often in kilns, and therefore are more evenly prepared, and the fibre soft, strong, and light in color—almost white as in the Italian and French hemp. On the contrary most of the American hems are dew retted, and are exposed to alternate freezing and thawing, as the stalks lie on the ground, giving an inferior product, uneven, and very dark in color, often a slate gray. See CORDAGE; CORDAGE INDUSTRIES; FIBRE; FLAX; MANILA HEMP; RAMIE; SISAL.

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Hemp-agrimony. See EUPATORIUM.

Hemp-nettle, a genus (*Galeopsis*) of European plants of the mint family, two species of which have become naturalized as weeds in the eastern United States.

Hemp'hill, James C., American journalist: b. Due West, Abbeville County, S. C., 18 May 1850. Was graduated at Erskine College in his native town in 1870 and entered journalism as editor of the Abbeville, S. C., 'Medium' in 1871. In 1880 he joined the staff of the

Charleston *News and Courier*, of which since 1888 he has been manager and editor.

Hempl, George, American philologist: b. Whitewater, Wis., 6 July 1850. He was graduated at the universities of Michigan in 1879 and of Jena in 1889, and was appointed instructor in German at Johns Hopkins University in 1884. After spending three years abroad (1886-9) in study at Göttingen, Tübingen, Strasburg, and Berlin, he became junior professor of English in the University of Michigan, where he has been professor of English philology and general linguistics since 1897. He has been a voluminous writer, and among his technical works may be mentioned 'German Orthography and Phonology' (1897); 'German Grammar' (1901).

Hempstead, N. Y., village, in the town of the same name, in Nassau County; on the Long Island Railroad; about 15 miles east of the borough of Brooklyn, and 10 miles from the ocean. The village was settled in 1643 by people from New England. The Presbyterian Society of Hempstead claim the oldest Presbyterian organization in the country, dating their beginning in this village in 1644. Hempstead is located in a section of Long Island in which there are many summer homes. During the war with Spain an encampment for State troops was located at Hempstead; it was called Camp Black after the then governor of the State. The chief industrial interests are market gardening, farming, and the manufacturing of cork insoles, phosphates, and carriages. Pop. (1910) 4,964.

Hempstead, Texas, town, county-seat of Waller County; on the Houston & T. C. railroad; about 50 miles northwest of Houston and 113 miles east by south of Austin. It is situated in a fertile agricultural region, noted for its cotton fields and its vegetable products. It has a cottonseed-oil mill, cotton-gins, and its trade is chiefly in cotton, grain, fruits, and vegetables. Pop. 1,978.

Hems, or Homs, hōms (Lat. *Emesa*), Syria, an ancient city, near the Orontes and the Lake of Homs, 86 miles northeast of Damascus. Its temple of the sun-god Elagabalus was famous, and one of its priests became emperor of Rome, assuming its title, in 218. Here in 272 Zenobia was defeated by Aurelian, and in 1832 the forces of the sultan of Turkey by Ibrahim Pasha. The town is still surrounded by its ancient walls now in a ruinous condition. It has some manufactures of silk goods and gold ornaments, and a trade in oil and agricultural produce. Pop. est. 30,000.

Hem'street, Charles, American journalist and author: b. New York 20 Sept. 1866. He entered the profession of journalism as a reporter in 1886, and was connected with the City Press Association until 1900, when he resigned to devote himself to literature and historical research. He has published: 'Manhattan' (1888); 'Nooks and Corners of Old New York' (1899); 'The Calendar of Old New York' (1900); 'History of New York City' (1901); 'When Old New York was Young' (1901).

Hem'ng, Bracebridge, English author: b. London 1832; d. 1891. In early life a journalist he began at the age of 35 a series of sensational tales for boys known as the 'Jack Hark-

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away' stories, which for a dozen years had great vogue in Great Britain and the United States. He wrote not only some 20 serial stories having to do with the adventures of 'Jack Harkaway,' but upward of 40 volumes of sensational fiction, none of which, however, found readers in America.

Hen-hawk, or **Chicken-hawk**, any kind of hawk which attacks poultry, or is supposed to do so. Two or three large buzzard-hawks are popularly so called in the eastern United States, and at least two smaller falcons. In the West, and in other parts of the English-speaking world, are other species of the same repute, more or less well-deserved. In England the analogue of the American marsh-hawk (q.v.) is known as "hen-harrier." Certain owls everywhere kill much poultry where it is not safely housed at night. In North America the best known hen-hawks are the broad-winged, red-tailed, and red-shouldered (q.v.; also **BUZZARD**). They are comparatively harmless to poultry, however, feeding mainly on squirrels, mice, frogs, etc. The broad-wing (*Buteo pennsylvanicus*) is one of the most familiar of our hawks, breeding numerous in the woods all over the country. It is 16 inches long, with the tail 7 inches, and the wing 11 inches. The upper parts are dull umber-brown, the tail almost black, crossed by two to four pale brown bands; the lower parts are dull rufous brown, nearly unbroken on the breast. It is rather sluggish in temperament, though capable of swift and bold action, and feeds mainly on mice, but will now and then seize young chickens, ducklings, etc. On the whole, as in the case of the other buzzard-hawks, it is of more service than injury to the agriculturist. The real culprits are two small, swift, agile falcons, Cooper's (*Accipiter cooperi*), and the sharp-shin (*A. velox*). The former is nearly two feet long, grayish-brown on the upper parts and white below, with the sides and breast barred with dusky red-brown, and tail barred with blackish. The sharp-shin has much the same colors, but is little more than half as large, and is further distinguished by the triangular shape of the tarsus, giving it an edge in front. These bold and active falcons live mainly on birds, and on farms prey largely on chickens and house-sparrows, compensating somewhat for the former by killing the latter. Consult Fisher, 'Hawks and Owls of the United States' (Washington 1893).

Henbane, a dangerous plant (*Hyoscyamus niger*) of the order *Solanaceæ*, which contains the tobacco, stramonium and other plants abounding in narcotic poisons. The black henbane (*Hyoscyamus niger*) represents some 15 species of the Mediterranean region, and springs up in waste places throughout Great Britain and the eastern United States, where it has become naturalized. It is an annual, somewhat bushy, about two feet high, with large sinuated or sharply lobed leaves without leaf-stalks, and large dingy yellow flowers with purplish veins. The whole plant is covered with unctuous hairs, and has a nauseous smell. The seeds contain in largest quantity the specific alkaloid hyoscyamin, which crystallizes in stellated acicular crystals of a silky lustre. The symptoms of poisoning by henbane are similar to those produced by other narcotic poisons, and the proper treatment is the same as in cases of poisoning

by opium. In medicine henbane is employed both externally and internally. The leaves are the part commonly used; they are gathered and quickly dried when the plant is in full flower. Fomentations of henbane are applied to painful glandular swellings, parts affected with neuralgia, etc., and are often found to afford relief. An extract of henbane is sometimes employed instead of belladonna to dilate the pupil of the eye. Tincture and extract of henbane are often administered in cases of annoying cough, spasmodic asthma, and other diseases requiring sedatives and anti-spasmodics. For many cases it has one great advantage over laudanum, in not producing constipation. The other species of henbane possess similar properties. The dried stalks of *H. albus* are used by smoking in Greece to allay toothache.

Hen'derson, Charles Hanford, American educator and author: b. Philadelphia 30 Dec. 1861. He was graduated from the University of Pennsylvania in 1882, was lecturer at the Franklin Institute 1883-5, 1885-6; lecturer on education at Harvard 1897-8; and director of Pratt Institute, Brooklyn, 1898-9. He has published 'Elements of Physics' (1900); 'John Percyfield: the Anatomy of Cheerfulness' (1903); 'The Children of Good Fortune' (1904).

Henderson, Charles Richmond, American educator: b. Covington, Ind., 17 Dec. 1848. He was graduated from the University of Chicago in 1870, and has been professor of sociology there since 1892. He was president 26th National Conference of Charities 1898-9, and vice-president National Prison Association. He has published 'Social Spirit in America' (1896); 'Social Settlement' (1897); 'Social Element' (1898).

Henderson, David Bremner, American statesman: b. Old Deer, Scotland, 14 March 1840; d. Dubuque, Iowa, 25 Jan. 1906. He was educated in the public schools and Upper Iowa University; in 1861 entered the army as lieutenant of the Twelfth Iowa regiment; lost a leg at Corinth (1863), and was discharged from the service. He then became commissioner of the board of enrolment in the 3d Iowa district, but re-entered the army as colonel in 1864. He studied law and was admitted to the bar in Iowa in 1865, and was United States district attorney in the northern division of Iowa 1869-71. He early became prominent in the local politics of his district, and was a delegate to three Republican national conventions. In 1882 he was elected to the House of Representatives, and was re-elected biennially till 1902. He was for many years one of the leaders of the Republicans in the House, served on the committee of appropriations for 10 years, and was chairman of the judiciary committee and a member of the committee on rules in the 54th and 55th Congresses. He assisted Speaker Reed (q.v.) in the making of the "Reed rules," was consistently an advocate of sound money, and a strong supporter of President McKinley's Cuban policy. At the organization of the 56th Congress in 1899 he was chosen speaker of the House, and re-elected in 1901; he was an impartial presiding officer and took important part in shaping the legislation made necessary by the Spanish war and the acquisition of new territory. In 1902 he

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declined a unanimous renomination from his district, because he could not support the policy of tariff revision then made a prominent issue by Iowa Republicans.

Henderson, Isaac, American journalist and novelist: b. Brooklyn, N. Y., 13 Feb. 1850; d. 1 April 1909. He was graduated from Williams College in 1872, and joined the staff of the *New York Evening Post*, of which journal he became publisher in 1876. He sold his interests in 1880, and went abroad in 1888, making his home in London and Rome. Arthur of 'The Prelate' (1898); 'Agatha Page' (1900).

Henderson, James Pinckney, American soldier and politician: b. Lincoln County, North Carolina, 21 March 1808; d. Washington, D. C., 4 June 1858. He practised law in Mississippi; went to Texas in 1836, and became secretary of state of the Texan Republic 1837-9. In the latter year he was sent as a minister to England and France to secure the recognition of Texan independence, and went to Washington in 1844 to secure annexation. He was a member of the Texas constitutional convention 1845, and the following year was elected first governor of the State. In 1857 he was appointed senator from Texas as a State Rights Democrat. Henderson fought in the Mexican War and Congress gave him a sword for his gallantry.

Henderson, Mary N. Foote, American writer on domestic science: b. New York 1842. She was married to J. B. Henderson, and in 1876 organized the St. Louis School of Design. She is the author of 'Diet for the Sick,' 'Practical Cooking and Dinner Giving.'

Henderson, Peter, American horticulturist: b. Porthhead, Scotland, 1823; d. Jersey City, N. J., 17 Jan. 1890. He came to America in 1843, and opened a seed-store in New York city in 1862. He has been called "the father of horticulture and ornamental gardening in the United States." He published 'Practical Floriculture' (1867); 'Gardening for Profit' (1866); 'Gardening for Pleasure' (1875); 'Garden and Farm Topics' (1884); 'How the Farm Pays' (1884).

Henderson, Richard, American pioneer: b. Hanover County, Virginia, 1734; d. North Carolina 1785. He studied law and in 1769 was appointed associate justice of the superior court of North Carolina. After the adoption of the Declaration of Independence he declined reelection to the bench, in order to participate in the scheme of the Transylvania Land Company. By this scheme the company organized as a political community with president, legislature, and judges, all the territory lying between the Cumberland River, the Cumberland Mountains, and the Kentucky River. The State of Virginia annulled the deed of sale of this tract of territory which the Cherokee Indians had given to the Transylvania Land Company, but as a reward for the pioneer work of the company, granted them an area 12 miles square on the Ohio River, below the mouth of the Greene River.

Henderson, William James, American musical critic and author: b. Newark, N. J., 4 Dec. 1855. He was graduated from Princeton College in 1876, and joined the staff of the *New York Tribune*, the following year becoming musical critic of the *New York Times*. He

was associate editor of 'The Standard Dictionary' (1892-4), and has published: 'The Story of Music' (1889); 'Preludes and Studies' (1891); 'Sea Yarns for Boys' (1894); 'Afloat with the Flag' (1895); 'Elements of Navigation' (1895); 'The Last Cruise of the Mohawk' (1897); 'What is Good Music?' (1898); 'How Music Developed' (1899); 'The Orchestra and Orchestral Music' (1899); 'Richard Wagner' (1901).

Henderson, Ky., city, county-seat of Henderson County; on the Ohio River, and on the Illinois C., the Louisville & N., the Louisville, H. & St. L. R.R.'s; about 10 miles below Evansville, Ind., and 103 miles, in direct line, southwest of Louisville. It has regular steamboat connection with Louisville, Evansville, Memphis, and other river ports. It is one of the oldest settlements on the Ohio River, but it was not incorporated until 1797. It is situated in a fertile agricultural region, rich in timber and coal. The chief manufactures are cotton and woolen goods, flour, hominy, lumber, tobacco products, furniture, carriages and wagons, foundry products, car-works, and agricultural implements. Large shipments are made of corn, wheat, and tobacco. It has large coal and lumber yards, grain-elevators, tobacco-stemmeries, fine fairgrounds, and Atkinson Park, the area of which is about 100 acres. It has a sanatorium and a number of well-built churches and schools. The charter of 1893 provides for a mayor, who holds office four years and is not eligible for re-election, and a common council. The city owns and operates the electric-light and gas plants and the waterworks. Pop. (1910) 11,452.

Henderson, N. C., town, county-seat of Vance County, on the Southern and the Seaboard A. L. R.R.'s; about 12 miles east of Oxford and 42 miles north of Raleigh. Henderson was settled in 1820, but was not incorporated until 1842. It is situated in a cotton and tobacco region of the State. The chief industrial establishments are cotton-gins, cotton-seed oil mills, cotton-mills, knitting-mills, tobacco warehouses, wagon-factories, flour-mills, and lumber-yards. Its chief trade is in cotton and tobacco. Pop. (1890) 4,191; (1900) 3,746; (1910) 4,503.

Henderson, Texas, town, county-seat of Rusk County; on a branch of the International & G. N. railroad; about 122 miles southeast of Dallas and 165 miles north by east from Houston. It is situated in an agricultural section, and the chief industries are connected with agricultural products. Its chief industrial establishments are a foundry, a pottery, and cotton-gins. The trade is in manufactured articles, live-stock, cotton, and vegetables. It is the seat of a normal college.

Hendersonville, N. C., town, county-seat of Henderson County; on the Southern Railway; about 21 miles south of Asheville and 100 miles west of Charlotte. It is situated in a mountainous portion of the State, but in the valleys are fertile farm lands. The chief industrial establishments are a furniture factory, a tannery, a canning factory, and a lumber yard. Apples and vegetables are among the agricultural products shipped to other markets. Hendersonville has a large number of summer

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guests owing to the healthfulness of the climate and the beauty of the scenery. Pop. (1910) 2,818.

Hen'dricks, Thomas Andrews, American politician, 21st Vice-President of the United States: b. near Zanesville, O., 7 Sept. 1819; d. Indianapolis, Ind., 25 Nov. 1885. He was graduated at South Hanover College, Indiana, in 1841; studied law and was admitted to the Indiana bar in 1843. In 1845 he was elected to the legislature, and in 1850 and 1852 to Congress. In 1860 he was the Democratic candidate for governor of Indiana, but was defeated. He was a United States senator 1863-9; and at the Democratic National Convention of 1868 received 132 votes for the Presidential nomination. In the same year he was again defeated for the governorship of Indiana, but in 1872 was elected. In the Democratic National Convention of 1876 he was nominated for the Vice-Presidency, but the ticket, headed by Tilden, was defeated. Hendricks was again nominated for the Vice-Presidency in 1884, however, on the ticket with Cleveland, and on this occasion was elected.

Hen'drix, Eugene Russell, American Methodist bishop: b. Fayette, Mo., 17 May 1847. He was graduated from Wesleyan University, Middletown, Conn., 1867; and the Union Theological Seminary 1869. Appointed bishop of the Methodist Episcopal Church South, in 1886, he has since made official visits to China, Japan, Korea, Mexico, and Brazil. He is the possessor of John Wesley's manuscript 'Journal' written in America 1736-7. He has written 'Around the World' (1878); 'Skilled Labor for the Master' (1900).

Hengist, hēng'gist, Saxon founder of the kingdom of Kent in Great Britain: d. about 488. He and his brother Horsa were renowned among the Saxons for their bodily strength and the antiquity of their family, which derived its origin in a direct line from Odin. In 449 the Britons sued for aid from the Saxons against the inroads of the Scots and Picts. Under command of Hengist and Horsa the Saxons landed at the mouth of the Thames, attacked the enemies of the Britons, and defeated them near Stamford in 450 A.D. As soon as they had received reinforcements from home they sought occasion for a quarrel, and uniting with the Scots and Picts they attacked the Britons, who were forced to flee or submit to the Saxons. Some fled to Armorica (Haute-Bretagne), to which they gave their name. Hengist, who had lost his brother in the battle near Eglesford (now Aylesford) in 455 A.D., founded the kingdom of Kent. He established his residence in Canterbury. By some of our writers Hengist and Horsa are regarded as mythical personages.

Hening's Statutes, the first complete collection of the laws of any American State, including those of its colonial times, those repealed and those dropped in revision. These were the "Statutes at Large of Virginia, 1619-1792," in 13 volumes, published at Richmond 1809-23, by William Waller Hening, clerk of the court of chancery; Jefferson is said to have suggested the publication. It is highly valued as a historical source.

Hen'ley, William Ernest, English poet, critic, and journalist: b. Gloucester 23 Aug.

1849; d. Woking 12 July 1903. He entered on a journalistic career in London, and in 1877 became first editor of the magazine 'London.' He was then editor successively of the 'Magazine of Art' (1882-6), of the 'Scots'—later the 'National Observer'—(1888-93), and of the 'New Review' (1893-8). His first publication, 'In Hospital: Rhymes and Rhythms' (1888), was inspired by his own experiences as a patient in Edinburgh Infirmary. Its contents were subsequently included in 'A Book of Verses' (1888). A second volume of poems, 'The Song of the Sword,' appeared in 1892 (2d ed. as 'London Voluntaries' 1893). Both of these books were incorporated in the collection of his 'Poems' (1898). Later poetical works were: 'For England's Sake' (1900); and 'Hawthorn and Lavender, and Other Verses' (1901). Henley collaborated with Stevenson four plays, 'Deacon Brodie,' 'Beau Austin,' and 'Admiral Guinea' and 'Macaire.' He also edited, either alone or in cooperation with others, the following anthologies and collections: 'Lyra Heroica' (1891), an anthology of English patriotic verse; 'A London Garland: from Five Centuries of English Verse' (1895); 'Book of English Prose' (1896); 'English Lyrics, 1340-1800' (1897); 'The Works of Lord Byron' (1897); 'The Poetry of Wilfrid Blunt' (1896); and 'London Types' (1898), and was editor of a series of 'Tudor Translations.' The 'Centenary Burns' (1896-7) is an important work edited by him with the cooperation of T. F. Henderson. The fourth volume contains an elaborate estimate by Henley of Burns as poet and man, published separately in 1898. His critical work appears at its best in 'Views and Reviews: Literature' (1890), and 'Views and Reviews: Painting and Sculpture' (1901). Both as poet and critic he was prejudiced and aggressive, but keen, vigorous, and often distinguished in style. A paper on Stevenson contributed to the 'Pall Mall' in 1901 aroused much unfavorable comment by its arraignment of Balfour's 'Life.'

Henley-on-Thames, England, a market-town and municipal borough of Oxfordshire, on the Thames, 35 miles by rail west of London. The town is especially famous for its annual regatta in July, a notable event in the British sporting world. The university boat races are held on the river here, and Americans frequently take part in the various open events. Pop. about 6,000.

Henlopen. See CAPE HENLOPEN.

Henna, a shrub (*Lawsonia inermis*) resembling the privet, but of the order LYTHRACEÆ. It grows in moist situations throughout the north of Africa, Arabia, Persia, and the East Indies, and has acquired celebrity from being used by the inhabitants of those countries to dye the nails of their fingers and the manes, hoofs, etc., of their horses. For this purpose the leaves are dried, powdered, and made into a paste with hot water, which imparts a yellow color, requiring renewal every three or four weeks. It is cultivated extensively in Egypt, and the powdered leaves form a large article of export to Persia and Turkey. Henna is supposed to be the *kopher* of the Hebrew, translated *camphire* in the Song of Solomon.

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Hennepin, Louis, loo-ë-ën-păn or hën-ë-pîn, French Franciscan missionary and explorer in North America: b. Ath, Belgium, about 1640; d. Utrecht, Holland, about 1706. He entered a convent, and being sent by his superiors to Calais and Dunkirk, the stories he heard from the sailors inspired him with a desire to visit distant countries. At length he embarked for Canada, and arrived at Quebec in 1675. In 1676 he went to the Indian mission at Fort Frontenac, whence he visited the Five Nations and the Dutch settlement at Albany. In 1678 he was attached to La Salle's expedition, and, in company with the Chevalier de Tonty and the Sieur de la Motte, was ordered to sail from Fort Frontenac to Niagara, and there construct a vessel for navigating the Lakes above the falls. This accomplished, La Salle joined the party, and on 7 Aug. 1679 the adventurers began their voyage on Lake Erie. They passed through Lakes Erie, Huron, and Michigan, to the mouth of the St. Joseph's River, ascended this in canoes to the portage, carried their frail barks several miles by land to the Kankakee, and floated down this stream and the Iroquois to the Illinois, on the banks of which they built Fort Crèvecoeur near the present site of Peoria. After a delay of two months at this place, La Salle returned to Fort Frontenac for supplies, charging Father Hennepin with a voyage of discovery to the sources of the Mississippi, which had never been explored above the mouth of the Wisconsin. Accompanied by Picard du Gay and Michel Ako, he set out in a canoe 29 Feb. 1680, followed the Illinois to its mouth, and ascended the Mississippi to the Falls of St. Anthony, which he was the first European to see, and which he named in honor of his patron saint. This was on 30 April. Arriving at the mouth of the St. Francis River, in what is now the State of Minnesota, he traveled by land about 180 miles along its banks, naming it in honor of the founder of his order, and visited the Sioux Indians, whom he mentions by the names Issati and Nadouessioux. He stayed with them three months, being, according to his own account, held in captivity, and then, meeting a party of Frenchmen who had come into the country by way of Lake Superior, returned with them to Canada, descending the Mississippi to the Wisconsin, and passing up that river and down the Fox, and so through Green Bay to Lake Michigan. From Quebec he sailed for France, where he published in 1683 his *Description de la Louisiane Nouvellement Découverte au Sud-Ouest de la Nouvelle-France*, etc., containing the fullest published account of La Salle's first expedition, a history of his second voyage, and of Hennepin's own explorations, with a description of the upper Mississippi. Notwithstanding the writer's vanity and fondness for exaggeration, the work is valuable. He put off his clerical dress in Holland about 1697, but to the end of his life seems to have written himself: "Recollect missionary and apostolic notary." In 1697, 10 years after La Salle's death, Hennepin published his extraordinary *Nouvelle Découverte d'un Très-Grand Pays Situé dans l'Amérique entre le Nouveau Mexique et la Mer Glaciale*, etc., reprinted the next year under the title *Nouveau Voyage dans un Pays Plus Grand que l'Europe*, etc. In this work, which embodies his *Description de la Louisiane*, written anew and enlarged, he claims

to have descended to the mouth of the Mississippi, and to have been the first European who floated on that river. He gives a description of the scenery, Indian tribes, and distances along the route, with a minuteness which easily gained him credit for veracity, and explained his long silence on this important point by saying that he feared the enmity of La Salle, who had ordered him to follow a different course, and who prided himself upon his own claims as the first who descended the Mississippi to the Gulf of Mexico. Notwithstanding the utter impossibility of reconciling the dates given in Hennepin's narrative, the story obtained general credence until its falseness was exposed by Jared Sparks. (See *'Life of La Salle'* by Sparks in the *'Library of American Biography.'*) Consult: Saint-Genois, *'Les Voyageurs Belges du XIII. au XIX. Siècle'* (1867); Van Hulet, *'Notice sur le Père Louis Hennepin'* (1845); Shea, *'Discovery of the Mississippi'* (1852); Parkman, *'La Salle and the Discovery of the Great West'*; Winsor, *'Narrative and Critical History of America,'* Vol. IV. (1884).

Hennessey, William J., Anglo-American artist: b. Thomastown, County Kilkenny, Ireland, 1839. He was brought to New York when 10 years of age, and became a student of the Academy of Design in 1856. He paints in oil and water colors, with a preference for landscape, and draws in black and white as an illustrator. In 1863 he was elected a National Academician, and since 1870 has lived in London, England.

Hennessey, John, American Roman Catholic bishop: b. Ireland 20 Aug. 1825; d. Dubuque, Iowa, 4 March 1900. He came to the United States in 1847, and pursued his theological studies in Carondelet Seminary, near St. Louis. After serving several years as a missionary in Missouri he became professor in Carondelet Seminary in 1854, and its president in 1857. He was afterward pastor in St. Joseph, Mo.; became bishop of Dubuque in 1866, and archbishop in 1893.

Hennessey, John Joseph, American Roman Catholic bishop: b. County Cork, Ireland, 19 July 1847. He came to America in early life and was graduated at the Christian Brothers' College, St. Louis, Mo., in 1862. He was ordained priest in 1869; founded the Railroad Men's Benevolent Union 1871; established the Ursuline convent, Arcadia, Mo., 1877; and edited *'The Youth's Magazine,'* St. Louis, 1880-6. He was consecrated bishop of Wichita, Kan., in November 1888.

Henniker, Hon. Mrs. Arthur, English novelist. She is a daughter of Richard Monckton Milnes (q.v.), 1st Baron Houghton, and was married to Hon. Arthur Henniker in 1882. Her books, which have had an American as well as English circulation, include: *'Sir George'* (1891); *'Foiled'* (1893); *'Outlines'* (1894); *'In Scarlet and Gray'* (1896); *'Sowing the Seed'* (1898); etc.

Henningsen, Charles Frederick, American military officer: b. in England, of Swedish parents, 1815; d. Washington, D. C., 14 June 1877. He joined the Carlists in Spain in 1834, and later was a follower of Kossuth in the Hungarian Revolution. He went to Nicaragua in 1856, where he distinguished himself in the de-

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fense of Granada, and in the victory at Queresma. During the Civil War he served in the Confederate army, becoming a brigadier-general. He directed the construction of the first Minie rifles manufactured in the United States. His publications include 'Eastern Europe'; 'Past and Future of Hungary'; 'Sixty Years Hence'; 'Personal Recollections of Nicaragua'; 'The White Slave'; etc.

Henri, Robert, American painter: b. Philadelphia, Pa., 1865. He began his art studies in his native city and became an instructor in the Philadelphia School of Design. He has exhibited in Paris, and his picture 'Snow' was purchased by the French government and hangs in the Luxembourg. While in Paris he gathered round him a group of pupils in his studio, and as a landscape painter did much to impress younger men with his breadth and vigor of style. While he is a landscape painter of notable attainment, his portraits also are admirable for the power of individualization and the directness which characterizes them.

Henrietta, DUCHESS OF ORLEANS: b. Exeter 16 June 1644; d. St. Cloud, France, 30 June 1670. She was the daughter of King Charles I. Her mother fled with her to France where she was educated a Roman Catholic. Her marriage with the brother of Louis XIV., Philip of France, Duke of Orleans, was celebrated in March, 1661. Louis XIV. was desirous of detaching her brother, Charles II., from the triple alliance with Holland and Sweden, in order to accomplish his plan of obtaining possession of a part of Holland. She went, therefore, in 1670, with the court to Flanders, and, under pretense of visiting her brother, passed over to Dover, where Charles was awaiting her arrival, and there succeeded in obtaining his signature to the secret treaty of Dover. Shortly after her return she died so suddenly as to excite the suspicion of her being poisoned. Bossuet pronounced her funeral oration.

Henrietta Maria, queen of Charles I. of England: b. Paris 25 Nov. 1609; d. Colombes, near Paris, 31 Aug. 1669. She was the youngest child of Henry IV. of France. Her marriage ceremony was celebrated by proxy at Paris in 1625. On Henrietta's first arrival in England she enjoyed great popularity with her husband's subjects, but her attachment to the Roman Catholic faith, combined with her hauteur and despotic ideas as to divine right, soon dissipated these favorable prepossessions. Much of Charles' subsequent arbitrary and injudicious procedure, may be traced indirectly to the influence of his queen. On the breaking out of the civil war Henrietta proceeded to Holland, where she procured money and troops for the assistance of her husband, and afterward joined him at Oxford. She again returned to the Continent, and took up her abode in France.

Henrietta, Texas, town, county-seat of Clay County; on the Little Wichita River, and on the Missouri, K. & T., and the Fort Worth & D. R.R.'s; about 90 miles northwest of Fort Worth and 128 miles northwest of Dallas. It is situated in an agricultural and stock-raising region, and the building-stone quarries in the vicinity add to the industrial wealth of the town. The chief manufactures are flour and lumber. The town has cotton-gins, grain elevators, lum-

ber-yards, and stock-yards. The trade is chiefly in live stock, grain, flour, lumber, cotton, and building-stone. Pop. (1910) 2,104.

Henrotin, Ellen M., American social reformer; b. Portland, Maine, July 1847. She was educated in Europe and in 1869 was married to Charles Henrotin, Belgian consul at Chicago. In 1893 she was vice-president of the Congress Auxiliary of the World's Columbian Exposition; the same year she was decorated by the Sultan of Turkey with the order of Chakfat and made an Officier de l'Academie by the French Republic, 1899. She was president from 1894 to 1898 of the General Federation of Women's Clubs.

Henry I., king of England, surnamed **BEAUCLEIC**, youngest son of William the Conqueror: b. Selby, Yorkshire, 1068; d. Rouen, France, 1 Dec. 1135. He was hunting with William Rufus in the New Forest when that prince received his mortal wound in 1100, and instantly going to London, caused himself to be proclaimed king, to the prejudice of his elder brother Robert, then absent in the Crusade. To reconcile the people to his usurpation Henry issued a charter containing concessions to public liberty, and also performed another popular act, by recalling Anselm, archbishop of Canterbury. In November 1100 he married Matilda, daughter of Malcolm III., king of Scotland. This union strengthened his party, when his brother landed an army in 1101, with a view of asserting his claim to the crown. Actual hostilities were prevented by Anselm, who induced Robert to accept a pension; and it was agreed that in the event of the death of either of the brothers without issue, the other should succeed to his dominions. He subsequently invaded Normandy, and in 1106 took Robert prisoner, and reduced the whole duchy. His usurpation of Normandy involved him in continual war, but although William, son of Robert, escaped out of custody, and was assisted by the king of France, Henry maintained possession of the duchy. His only son William was drowned in 1120 in returning from Normandy, and Henry was never seen to smile afterward. He married his only daughter, Matilda, to the Emperor Henry V., and when she became a widow married her a second time to Geoffrey Plantagenet, son of the Count of Anjou. Henry was succeeded by Stephen.

Henry II., king of England, the first of the line of the Plantagenets, b. Normandy 1133; d. Castle of Chinon, near Saumur, France, 6 July 1189. He was the son of Geoffrey, count of Anjou, and the empress Matilda, daughter of Henry I. He was invested with the duchy of Normandy, by the consent of his mother, in 1150. The next year he succeeded his father in the possession of Anjou and Maine, and by a marriage with Eleanor of Guienne, just divorced from Louis VII., king of France, annexed that province with Poitou to his other dominions. He succeeded Stephen as king of England in 1154. Although involved with his brother Geoffrey, who attempted to seize Anjou and Maine, and in a temporary dispute with France, he reigned prosperously till the memorable contest with Thomas Becket. Anxious to dominate the clergy, Henry in 1164 summoned a general council of nobility and prelates at Clarendon, which assembly passed the famous

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constitutions named from that place, the effect of which was to render the church and ecclesiastical dignitaries subject to the temporal authority. (See CLARENDON, CONSTITUTIONS OF.) After the murder of Becket Henry receded from his position and restored the Church to its rights. Before this matter was terminated, Henry, in 1171, undertook an expedition into Ireland, and having left Earl Richard in the post of seneschal of Ireland he returned to England—proceedings so important to the future destinies of both countries having occupied only a few months. Being an indulgent father Henry had assigned to each of his four sons a provision out of his extensive territories. The eldest son, Henry, was not only declared heir to England, Normandy, Anjou, Maine, and Touraine, but actually crowned in his father's lifetime. On paying a visit to the court of his father-in-law, Louis VII. of France, the prince was induced by the French monarch to demand of his father the immediate resignation either of the kingdom of England or of the dukedom of Normandy. This request being refused he withdrew from his father's court, and was openly supported in his claim by Louis. Henry's various gallantries, exemplified in the popular and not altogether unfounded legend of fair Rosamond, or Rosamond Clifford, also embroiled him with his queen, Eleanor, who incited her other sons, Richard and Geoffrey, to make similar claims. A general invasion of Henry's dominions was in this way concerted, and began in 1173 by an attack on the frontiers of Normandy, but the king presently subdued his opponents and entered into an accommodation with his sons on less favorable terms than they had previously rejected. Henry now employed himself in regulations and improvements which equally manifest his capacity and love of justice. He partitioned England into four judiciary districts, appointed itinerant justices to make regular excursions through them, revived trial by jury, discouraged that by combat, and demolished all the newly erected castles as shelters of violence and anarchy. The turbulence of his sons still disquieted him; but Henry, the eldest, was cut off by fever in 1183, and three years after the death of the equally restless Geoffrey occurred. Philip Augustus, then king of France, however, continued to foment the differences between Henry and his sons, and Richard was again prompted to rebel. A war followed, the event of which was so unfavorable to Henry, that he was at length obliged to agree that Richard should receive an oath of fealty from all his subjects. He also stipulated to pay a sum of money to the French king, and to grant a pardon to all Richard's adherents. The mortification of Henry at these humiliating terms was aggravated to despair when he saw the name of his favorite son John at the head of the list of delinquents whom he was required to pardon. Henry II. ranks among the greatest kings of England. His wisdom and love of justice were acknowledged by foreign potentates, who made him arbiter of their differences, and regarded him as the first prince of the age. Consult: Stubbs, 'The Early Plantagenets' (1876); Mrs. J. R. Green, 'Henry II.' (1888); Norgate, 'England Under the Angevin Kings' (1887).

Henry III., king of England: b. Winchester 1 Oct. 1207; d. Westminster 16 Nov. 1272.

He was the son of John, whom he succeeded in 1216. As Henry approached to manhood he displayed a character wholly unfit for his station. One of his first false steps was to discard his most faithful and able minister Hubert de Burgh. In 1236 Henry married Eleanor of Provence, which increased the dislike which his subjects already felt toward him; for she brought a train of foreigners to the court, and encouraged her husband in extravagant courses which forced him to all kinds of oppressive exactions to raise money. He received frequent grants of money from Parliament, but always on condition of confirming the Great Charter, which had been extorted from King John. Henry at length raised the national discontent to such a pitch that the nobles rose in rebellion under Simon de Montfort, the earl of Leicester, the husband of the king's sister; and in 1258, obliged the king to sign a body of resolutions, which threw all the legislative and executive power into the hands of an aristocracy of twenty-four barons, assisted by a lower house, consisting of four knights chosen from each county. By the aid of his son Edward, Henry was gradually restored to authority; on which Leicester, calling in Llewellyn, prince of Wales, involved the kingdom in a civil war. The power of the barons was by this means partially restored; but both parties agreed to abide by the award of Louis IX., king of France. This being favorable to the king, Leicester and the barons refused to submit to it, and a battle was fought near Lewes, in which Henry was taken prisoner, and the person of Prince Edward also ultimately secured. A convention provided for the future settlement of the kingdom; but in the meantime Leicester ruled without control. To him, however, was owing the first example of a genuine House of Commons in England; for in a Parliament summoned by him in 1265, deputies from boroughs were sent, as well as knights of shires. Prince Edward at length escaped, and, assembling an army, defeated Leicester's son. The decisive battle of Evesham (1265) quickly followed, in which Leicester himself was slain. Replaced upon the throne Henry remained as insignificant as ever. He died in the 64th year of his age, and the 56th of his reign, the longest in English history, except those of George III. and Victoria. He was succeeded by his son, Edward I.

Henry IV., king of England, first king of the house of Lancaster: b. Bolingbroke 3 April 1367; d. 19 March 1413. He was the eldest son of John of Gaunt, duke of Lancaster; fourth son of Edward III. by the heiress of Edmund, earl of Lancaster, second son of Henry III. In the reign of Richard II. he was made Earl of Derby and Duke of Hereford, and while bearing the latter title appeared in the Parliament of 1398, and preferred an accusation of treason against Mowbray, duke of Norfolk. The latter denied the charge, and offered to prove his innocence by single combat, which challenge being accepted, the king appointed the lists at Coventry; but on the appearance of the two champions at the appointed time and place, Richard would not suffer them to proceed. Both were banished the kingdom, Norfolk for life, and Hereford for 10 years, shortened by favor to four, with the further privilege of immediately entering upon any inheritance which might accrue to

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him. On the death of John of Gaunt in 1399 he succeeded to the dukedom of Lancaster, and laid claim, according to agreement, to the great estates attached to it; but Richard retained possession of the estates. The duke, therefore dis-regarding the unfinished term of his exile, landed with a small retinue at Ravenspur in Yorkshire, where he was quickly joined by the Earls of Northumberland and Westmoreland, and soon found himself at the head of 60,000 men. Richard falling into the hands of his enemies, was brought to London by the duke, who now began openly to aim at the crown. A resignation was first obtained from Richard, who was then solemnly deposed in Parliament; and Henry unanimously declared lawful king under the title of Henry IV. The death of Richard soon removed a dangerous rival; yet a short time only elapsed before the nobles rebelled against the king of their own creation. The first plot, in 1400, was discovered in time to prevent its success, but an insurrection in Wales, under Owen Glendower, proved more formidable. That chieftain having captured Mortimer, earl of March, who was descended from Lionel, duke of Clarence, the second son of Edward III., and therefore the lineal heir to the crown, Henry would not suffer his relation, the Earl of Northumberland, to treat for his ransom. He thus offended that powerful nobleman, who, with his son, the famous Hotspur, soon after joined Glendower. The king met the insurgents at Shrewsbury, and a furious battle ensued, 21 July 1403, which ended in the death of Percy, and the defeat of his party. A new insurrection, headed by the Earl of Nottingham and Scrope or Scroop, the archbishop of York, broke out in 1405, which was suppressed by the king's third son, Prince John. The archbishop afforded the first example in this kingdom of a capital punishment inflicted upon a prelate. The rest of this king's reign was comparatively untroubled. Henry was succeeded by his son of the same name.

Henry V., king of England: b. Monmouth 19 Aug. 1387; d. Vincennes, France, 31 Aug. 1422. He succeeded his father, Henry IV., in 1413. His dissipated youth, and fondness for joviality and low company, gave his father much uneasiness; but circumstances occurred, even in the midst of his wildness, which showed that better principles were latent in his mind. His conduct when he ascended the throne justified the best expectations. The circumstances of France, torn asunder by the opposing factions of the dukes of Orleans and Burgundy, afforded a tempting opportunity to an ambitious neighbor, and Henry was easily induced to revive the claims of his predecessors upon that country. He accordingly assembled a great fleet and army and landed near Harfleur, 14 Aug. 1415. He took that town after a siege which so much reduced his army that he was advised to return to England by sea. But Henry determined to march on Calais, and on his way was met on the plain of Agincourt by a French army ten times as numerous as his own. A battle took place there on 25 October, in which the French host was totally defeated, with a comparatively trifling loss on the side of the English. In 1417, the liberal grants of the Commons enabled Henry once more to invade France with 25,000 men. By the famous Treaty of Troyes (21 May 1420), Henry engaged to marry the Princess Catharine,

and to leave Charles in possession of the crown, on condition that it should go to Henry and his heirs at his decease, and be inseparably united to the crown of England. Henry, after espousing Catharine, took possession of Paris, and then went over to England to raise recruits for his army. All his great projects seemed about to be realized, when he was attacked by a disease which carried him off at the age of 34, and in the 10th year of his reign. He was succeeded by his son Henry VI. Henry V., as the gallant, youthful, and successful conqueror of France, is a favorite name in English history; but he was inferior in wisdom and solid policy to many of his ancestors.

Henry VI., king of England: b. Windsor 6 Dec. 1421; d. London 21 May 1471. He was crowned at Westminster in November 1429, and at Paris in December 1430. As he was not nine months old at the death of his father Henry V., John, duke of Bedford, a brother of the late king, was appointed Regent of France; and Humphrey, duke of Gloucester, another brother of the same, Protector of the realm of England, with a council at his side appointed by Parliament. A few weeks after Henry's succession, Charles VI. of France died, when, according to the provisions of the Treaty of Troyes, Henry was proclaimed King of France. But the French did not quietly submit, and a war began at first favorable to the English, but in the end, after they had been roused to more effectual efforts by the heroism of Joan of Arc (q.v.) (1428-30), resulted in the almost total loss to the English of their possessions in France. In 1453 nothing remained to them in that country but Calais. In April 1445, Henry married Margaret of Anjou, daughter of René of Provence. Two years later the Earl of Suffolk acquired the chief power in the kingdom, and was created first marquis and then duke. His government was very unpopular, which caused the people to look to the claim of Richard, duke of York. The insurrection of Cade followed, and the Duke of York was by Parliament declared Protector of the kingdom. The York and Lancaster parties were now in such a state that the sword only could decide between them; and that course of civil contention commenced, the first bloodshed in which occurred at St. Albans in May 1455, and as far as the reign of Henry was concerned, the last in the battle of Tewkesbury in 1471. When the latter took place the king was a prisoner in the Tower, where he soon after died, but whether by a natural or violent death is uncertain. Henry was gentle, pious, and well-intentioned, but weak. Eton College reveres Henry as its founder, as does likewise King's College, Cambridge.

Henry VII., king of England, first sovereign of the house of Tudor: b. Wales 28 Jan. 1457; d. Richmond, Surrey, 22 April 1509. He was the son of Edmund, earl of Richmond, son of Owen Tudor and Catharine of France, widow of Henry V. His mother, Margaret, was the only child of John, duke of Somerset, grandson of John of Gaunt. After the battle of Tewkesbury he was carried by his uncle, the Earl of Pembroke, to Brittany, to seek refuge in that court from the jealousy of the victorious house of York. On the usurpation of Richard the young Earl of Richmond was naturally turned to as the representative of the house of Lan-

caster. In 1485 Richmond landed at Milford Haven, where he was immediately joined by some leaders of rank, but had only 6,000 men when Richard met him at Bosworth, with an army twice as numerous in appearance; but the defection of Lord Stanley with his forces, who joined Richmond during the battle, obtained for the latter a complete victory. Henry was proclaimed king on the field of battle, and his right was subsequently recognized by Parliament. In 1486 he married Elizabeth, daughter of Edward IV., and heiress of the house of York, and thus united the claims of the rival houses of York and Lancaster. The reign of Henry VII. was troubled by repeated insurrections. The project of France for annexing the province of Brittany, by marriage with the heiress, induced Henry to declare war, but his measures were so tardy and parsimonious that the annexation was effected. He then raised large sums on the plea of the necessity for hostilities; and landing a numerous army at Calais in 1492, almost immediately accepted a large compensation for peace. The Duchess-dowager of Burgundy, governess of the Low Countries, now advocated the cause of Perkin Warbeck, a youth who gave himself out to be Richard Plantagenet, the younger of the two sons of Edward IV., supposed to have been murdered in the Tower of London, and the justice of his claim has been maintained even by some historians of a recent date. The duchess professed to be satisfied with the proofs of his identity, and acknowledged him as her nephew. He was so far successful as to secure a large following, with which he marched to Taunton; but there his heart failed him, and he fled. Captured by Henry he confessed himself an impostor, and was sent to the Tower, where he became acquainted with the Earl of Warwick, and persuaded him to accompany him in an attempt to escape. They were both retaken, and Warwick was recommitted to the Tower and Perkin Warbeck hanged at Tyburn (1499). Soon after, the king ordered the Earl of Warwick also to be executed. After a long negotiation he brought about a match between the Infanta Catharine, daughter of Ferdinand of Aragon and of Isabella of Castile, and his eldest son Arthur; and on the death of the latter, in order to retain the dowry of this princess, caused his remaining son Henry to marry the widow by Papal dispensation, an event which, in the sequel, led to a separation from the See of Rome. He married his eldest daughter to James IV., king of Scotland, from which union there ultimately resulted the union of the two crowns. His reign was, upon the whole, beneficial to his country. Being conducted upon pacific principles it put a period to many disorders, and gave an opportunity to the nation to flourish by its internal resources. His policy of depressing the feudal nobility, which proportionably exalted the middle ranks, was highly salutary; and it was especially advanced by the statute which allowed the breaking of entails and the alienation of landed estates.

Henry VIII., king of England: b. Greenwich 28 June 1491; d. Westminster 28 Jan. 1547. He succeeded his father, Henry VII., in 1509. His disposition for show and magnificence soon squandered the hoards of his predecessor. James IV., king of Scotland, having made an incur-

sion with a numerous body of troops into England, was completely defeated and slain at the battle of Flodden Field. Henry, however, granted peace to the Queen of Scotland, his sister, and established an influence which rendered his kingdom long secure on that side. The aggrandizement of Cardinal Wolsey now began to give a leading feature to the conduct of Henry, that prelate being appointed chancellor in 1515. His favor was now sought by Maximilian I., emperor of Germany, who hoped to secure the support of England against France, and as Wolsey was at first neglected by the French king the German emperor gained his point; but when Maximilian was succeeded by Charles V., hereditary king of Spain as well as emperor of Germany, Francis found it expedient to gain Wolsey, and for that purpose entered into an amicable correspondence with them. In order to cement this new friendship the two monarchs had an interview near Calais, the magnificence of which gave the place of meeting the denomination of the Field of the Cloth of Gold (1520). Notwithstanding these indications, a prospect of the papacy being artfully held out to the cardinal by the young emperor Charles, his interest at length gained a preponderance in the English councils. The principles of the Reformation were now making rapid strides, and Henry himself wrote a Latin book against the tenets of Luther, which he presented to Pope Leo X., who favored him in return with the title of defender of the faith. After being married to Catharine for about 18 years, Henry began to feel some scruples as to the validity of the marriage, on the ground that she had previously been his brother's wife, and his scruples were no doubt increased by the fact of his having conceived a passion for Anne Boleyn, one of the queen's maids of honor. He accordingly applied in 1527 to Pope Clement VII. for a divorce, and the Pope appointed cardinals Wolsey and Campeggio to try the case. Wolsey had at first been favorable to the project of a divorce, but when he perceived the desire of Henry to marry Anne Boleyn, fearing that this marriage would result in winning over Henry to the side of the reformers, since Anne Boleyn's friends belonged to that party, he did all in his power to prolong the inquiry, until the commission was at last withdrawn, and it was decided by the Pope that the case should be tried at Rome. This procrastination on Wolsey's part led to his own ruin. Henry, disgusted at these delays, eagerly caught at the advice of Thomas Cranmer (q.v.), afterwards archbishop of Canterbury, to refer the case to the universities, from whom he got the decision desired. In May 1533 his marriage with Catharine was declared null, and as he had by that time privately married Anne Boleyn, this second marriage was a few days later declared lawful. As these decisions were not recognized by the Pope, an act of Parliament was obtained in the following year (1534), setting aside the authority of the chief pontiff in England, which was followed by another in 1535 declaring Henry the supreme head of the church. Thus was effected the great revolution by which, in ecclesiastical annals, this reign is so much distinguished. The birth of a daughter by the new queen produced a bill for regulating the succession, which settled it on the issue of this marriage, and declared

the king's daughter by Catharine illegitimate. But although Henry discarded the authority of the Roman Catholic Church, he adhered to its theological tenets. While he executed Bishop Fisher and Sir Thomas More (who had been appointed chancellor after the fall of Wolsey) for refusing the oath of supremacy, he displayed an aversion to the principles of the reformers, and brought many of them to the stake. Finding that the monks and friars in England were the most direct advocates of the papal authority, he suppressed the monasteries by act of Parliament. The fall of Anne Boleyn was, however, unfavorable for a time to the reformers. Henry then married Jane Seymour, and the birth of Prince Edward in 1537 fulfilled his wish for a male heir, although his joy was abated by the death of the queen. Henry now resolved to marry again, and Thomas Cromwell, a Protestant, who had succeeded More as first minister, recommended Anne of Cleves. The marriage took place in January 1540, and Henry created Cromwell Earl of Essex; but his dislike to his new wife hastened the fall of that minister, who was condemned and executed upon a charge of treason. At the same time Henry procured from the convocation and Parliament a divorce from Anne of Cleves. He then married Catharine Howard, niece to the Duke of Norfolk, but Henry now found that his new queen, of whom he was very fond, had proved false, and on further inquiry her conduct before marriage was discovered to have been loose and criminal. She was therefore accused and brought to the block in 1542. In 1543 he married his sixth wife, Catharine Parr, widow of Lord Latimer, a lady of merit, secretly inclined to the Reformation.

Henry was succeeded by his son, Edward VI. The complete union of Wales with England, and the conversion of Ireland into a kingdom, date from the reign of Henry VIII. Consult: *Histories of England* by Lingard (1854-5); Froude (1870); and Green (1879 and 1884); also Brewer, 'History of the Reign of Henry VIII. to the Death of Wolsey' (1884); Dixon, 'History of the Church of England from the Abolition of the Roman Jurisdiction' (1884-91); Froude, 'The Divorce of Catharine of Aragon' (1891).

Henry I., king of France: b. 1005; d. Vitri, 4 Aug. 1060. He was the third son of Robert II. He succeeded to power in 1031. His reign was a continuous series of difficulties with the nobility and with the growing power of the clergy. His younger brother, Robert, led a revolt against him, but this he suppressed with the aid of Duke Robert of Normandy.

Henry II., king of France: b. St. Germain-en-Laye 31 March 1519; d. 10 July 1559. He succeeded his father, Francis I., 31 March 1547. He severely persecuted the Huguenots, and was involved in wars with the Emperor Charles V. and Philip II. of Spain. The Constable de Montmorency was defeated at St. Quentin (10 Aug. 1557); the Marshal de Thermes at Gravelines (13 June 1558), and the peace of Cateau-Cambrésis (3 April 1559) lost to France most of the advantages previously gained. Henry was a monarch of slight capability, despite his regal bearing.

Henry III., king of France: b. Fontainebleau 19 Sept. 1551; d. by assassination St. Cloud 2 Aug. 1589. He was the third son of Henry II. He fought, as Duke of Anjou, against the Huguenots, was elected king of Poland in 1573 and crowned 15 Feb. 1574, but in June 1574 left Poland and succeeded his brother, Charles IX., as king of France. The Peace of Beaulieu (1576), confirmed by the Edict of Poitiers (1577), granted to the Huguenots so many privileges that the Holy League was formed, seeking openly Catholic supremacy and secretly the elevation of Henry of Guise to the French throne. When all privileges granted to Huguenots were repealed by the Edict of Nemours (1585) war broke out. Henry of Navarre was victor at Coutras, while Henry of Guise drove the king from Paris. The king then caused the murder of Guise and Guise's brother, the Cardinal of Lorraine, in consequence of which the doctors of the Sorbonne absolved the people from obedience to him. He then joined cause with Henry of Navarre, with whom he marched against Paris; but in camp at St. Cloud was stabbed by Jacques Clément, a fanatical Dominican, 1 Aug. 1589. Henry III. was the last of the branch of Orléans-Angoulême of the stock of the Valois.

Henry IV., known as HENRY OF NAVARRE, king of France: b. Pau 13 Dec. 1553; d. 14 May 1610. He was a son of Anthony of Bourbon, Duke of Vendôme, and of Jeanne d'Albret, daughter of Henry, king of Navarre, and herself afterward queen of Navarre. Educated by his mother in the Calvinistic faith, he early joined, at her wish, the Protestant army of France, and served under Admiral Coligny. In 1572 he married Margaret of Valois, sister of Charles IX., and after the massacre of St. Bartholomew, which took place during the festivities in connection with this marriage, adopted the Roman Catholic creed. For the next four years he was compelled to reside in Paris, but 3 Feb. 1576 succeeded in making his escape, and after retracting, at Tours, the abjuration of Calvinism which he had made at Paris, put himself at the head of the Huguenots, and took a leading part in all the subsequent religious wars. He occupied a still more important position, when, in 1584, the death of the Duc d'Anjou, brother of the king (Henry III.), made him presumptive heir to the crown, as descended from Robert, Count of Clermont, the sixth son of Louis IX. Rejected by the Roman Catholic party and the League as a heretic, Henry found himself obliged to resort to arms to assert his claims. On 20 Oct. 1587 with an inferior force, he defeated the army of the League at Coutras. In 1589 he became king through the assassination of Henry III. (q.v.), but found innumerable difficulties in establishing his claims. His Protestant religion was brought forward by all the competitors to prejudice the Catholics against him. At the head of the opposite party stood the Duke de Mayenne. Philip II. of Spain also claimed the French throne, and sent aid to the League. Henry IV. defeated his enemies in the celebrated engagement of Ivry (14 March 1590). In consequence of this victory Paris was besieged, and Henry IV. was upon the point of compelling the citizens to surrender by famine, when the Spanish general, Alexander, Duke of Parma, by

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a skilful maneuver, obliged him to raise the siege. Convinced that he should never enjoy quiet possession of the French throne without professing the Catholic faith, Henry at length yielded to the wishes of his friends, was instructed in the doctrines of the Roman Church, and professed the Catholic faith, 23 July 1593, in the church of St. Denys. He was anointed king at Chartres in 1594; and entered the capital amid the acclamations of the people. He quickly brought France entirely into subjection, and concluded the war against Spain in 1598, by the Peace of Vervins, to the advantage of France. The same year was signalized by the granting of the Edict of Nantes, which secured to the Protestants entire religious liberty, and freed them from all political disabilities. Henry made use of the tranquillity which followed to restore the internal prosperity of his kingdom, and particularly the wasted finances. In this design he was so successful, with the aid of his prime minister Sully, that the national debt of 350,000,000 livres was diminished by 125,000,000, and 41,000,000 livres were laid up in the treasury. As Henry was riding through the streets of Paris he was stabbed by the fanatic Ravalliac. The great benefits which Henry IV. bestowed upon France entitle him to the designation which he himself assumed at an assembly of the Notables at Rouen in 1596, the Regenerator of France. His benevolent mind, his paternal love to his subjects, his great achievements, his heart, always open to truth, though it exposed his own faults, have preserved his memory in the hearts of the nation. To the end of his life he had to contend against the governors of provinces, Protestant as well as Catholic, who had rendered themselves almost independent under the last kings of the house of Valois. Many of the acts of his internal government show that, while he aimed at restoring the prosperity of the nation by encouraging agriculture, commerce, and manufacturing industries, he was determined by all means in his power to strengthen the authority of the crown. In his foreign policy Henry IV. revived the projects of Francis I. and Henry II. against the house of Austria, and re-established the influence of France in the Catholic states of Italy. He supported Holland in its revolt against Spain; allayed the bitterness of feeling between the Lutherans and the Calvinists, and induced them to form the Evangelical Union. Consult: Lacombe, 'Henri IV. et sa Politique' (1878); and Willert, 'Henry of Navarre and the Huguenots in France' (1893).

Henry V. (of France). See CHAMBORD, COMPTE DE.

Henry I., emperor of Germany: b. about 876; d. Memleben 2 July 936. He was the son of Otho I., the Illustrious, duke of Saxony, who had refused the regal dignity offered him in 912. Henry, on the death of his father, became duke of Saxony and Thuringia. He was chosen king of the Germans by the Franks and Saxons, April 919, at Fritzlar. The surname DER FINKLER or DER VOGLER (the Fowler), sometimes applied to him, did not arise until the 12th century, and is based upon the unauthentic legend that the princes who notified him of election found him at fowling. He subdued Duke Gisilbert of Lorraine, and in 924 concluded with the Hungarians a nine-years' treaty of peace,

with the condition that he should pay a yearly tribute. This tribute he finally refused (933), whereupon the Hungarians invaded his realm with two large armies which he defeated, the one near Göttingen, the other at Riade (Riethenburg). In 934 he waged a victorious contest against the Danes. He thoroughly reorganized the German defensive military system, built fortified cities, and fortified others. Though he did not technically possess the title of emperor, he was the real founder of the mediæval German empire, and is recognized as a wise ruler and skilful military leader.

Henry II., THE LAME, emperor of Germany: b. 6 May 973; d. Grona, near Göttingen 13 July 1024. He was the last of the Saxon line, a son of Henry the Quarrelor of Bavaria, and great-grandson of the Emperor Henry I. He inherited Bavaria on the death of his father in 995. On the death of Otho III. in the beginning of 1002 he laid claim to the kingdom, and was crowned at Mainz 7 June. He was for a time busily occupied in wars with Duke Boleslav II. of Bohemia, the Margrave Henry of Schweinfurt, and the Margrave Ernest of Austria. In 1004 and 1013 he was obliged to make expeditions to Italy, where Arduin of Ivrea was twice chosen king. Having thoroughly defeated his opponent, he was invested with the imperial insignia at Rome by Pope Benedict VIII. 14 Feb. 1014. His somewhat protracted struggle with Boleslav of Poland ended without any considerable success. At the call of the Pope he fought against the Greeks in lower Italy. For his zeal in the interests of the Church he was canonized by Eugenius III. in 1146.

Henry III., variously surnamed the OLD, the BLACK, and the PIOUS, emperor of Germany: b. Osterbeck, Netherlands, 28 Oct. 1017; d. Botfeld 5 Oct. 1056. He was the second of the house of the Salian Franks, son of the Emperor Conrad II., whom he succeeded in the imperial dignity 1039. He had already been chosen king in 1026. He weakened the power of the nobles by keeping the great fiefs when they became vacant for himself or members of his family, or by bestowing them upon less powerful nobles than had previously possessed them. He also extended the power of the empire by forcing the duke of Bohemia in 1042, and the king of Hungary in 1044, and again in 1047, to accept their dominions as imperial fiefs. His influence was paramount in Italy, especially in the south, where the Normans in Apulia and Calabria paid homage to him as their feudal chief. On the occasion of his first visit to Italy (1046) he put an end to the contention between Benedict IX., Sylvester III., and Gregory VI. for the papacy, causing them all to be deposed, and Suitger, bishop of Bamberg, to be elected in their stead with the title of Clement II. His efforts were now directed toward rooting out the evils which were rife among the clergy, but not less toward securing the permanence of the influence of the empire over the See of Rome. Henry III. was not only a powerful ruler, but also a patron of arts and sciences. He founded numerous schools in connection with the monasteries, and built the cathedrals of Worms, Mainz, and Spire.

Henry IV., emperor of Germany: b. 11 Nov. 1050; d. Liège 7 Aug. 1106. He was the

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son of Henry III. He was crowned at Aix-la-Chapelle in 1054. His reign was from the first disturbed by contests with his vassals. The Saxons joined with the inhabitants of Thuringia, drove Henry from Saxony (1073), and destroyed many of the castles which he had built to overawe the inhabitants. But some churches having been destroyed by the populace, Henry accused the Saxons to the pope of sacrilege, and thus gave him an opportunity to interfere as umpire. The Saxons offered to make every satisfaction; but Henry suddenly invaded their territory with a powerful army, and attacked them 9 June 1075, at Hohenburg, on the Unstrut, where they suffered a total defeat. He imprisoned nobles and ecclesiastics, and aroused the attention of the papacy. Gregory VII. (Hildebrand), who had been elevated to the papal chair some years before, without the consent of the imperial court, eagerly seized this opportunity to challenge Henry's usurpation of the power of investing bishops with the spiritual insignia of office, and in December 1075 presented to the king a list of charges, and demanded proofs of obedience to the Church. Henry then instigated the bishops, assembled by his order at Worms, to renounce their obedience to the pope (24 Jan. 1076). Gregory, however, pronounced the sentence of excommunication against him (22 Feb.), and absolved his subjects from their allegiance, and Henry soon found himself deserted. In this state of affairs he was obliged to go to Italy and make his submission to the pope. He found Gregory at Canossa, not far from Reggio, a strong castle belonging to Matilda, countess of Tuscany, whither he had retired for security. Three days successively, in the depth of winter, Henry appeared in a penitential dress, in the court of the castle, before the intercession of Matilda obtained for him an audience of the pope (28 Jan. 1077), when he was, after all, released from the sentence of excommunication only upon submitting to the most humiliating conditions. Some of the Italian princes, who had long been dissatisfied with Gregory, and were desirous of deposing him, gathered round Henry, who was not disposed to fulfil the hard conditions imposed upon him, and offered him their assistance. The German princes, however, at the instigation of the pope, assembled at Forchheim in 1077, and elected Rudolf, Duke of Swabia, king. Henry hastened back to Germany and overcame his rival, who lost his life in battle at Merseburg, in 1080. Gregory again excommunicated Henry; but at the councils of Brixen and Mainz in 1080, he was declared deposed by the German bishops as a heretic and a sorcerer, and Guibert, archbishop of Ravenna, set up in his place, with the title of Clement III. In 1081 Henry marched into Italy to take vengeance on Gregory, and appeared at Easter before Rome. He was not able in that year, however, to pursue the siege of the city, which did not fall into his hands till 1084. He was forced by a conspiracy of the majority of the nobles, led by his son, Henry V., to abdicate at Ingelheim 31 Dec. 1105.

Henry V., emperor of Germany: b. 11 Aug. 1081; d. Utrecht 23 May 1125. He was the son and successor of Henry IV. He was crowned emperor in 1111. His reign was continually disturbed by troubles with the papacy.

He was excommunicated no less than four times, and finally in the concordat of Worms (23 Sept. 1122) conceded the advantage to the pope. He also carried on wars with Flanders, Hungary, and Poland, and with various German nobles. He was the last of the Salic or Frankish family of emperors, which was succeeded by the Swabian house.

Henry VI., the **CRUEL**, emperor of Germany: b. 1165; d. Messina 28 Sept. 1197. He was the son of Frederick I. (Barbarossa), was crowned king in 1169, and succeeded his father as emperor in 1190. He was involved in wars in Italy to assure his possessions there. It was during his reign that Richard Cœur de Lion, returning from Palestine, was imprisoned by Leopold of Austria and surrendered to the emperor, who exacted a heavy ransom.

Henry VII., of **LUXEMBURG**, emperor of Germany: b. 1269; d. Buonconvento, Italy, 24 Aug. 1313. He was son of the Count of Luxembourg, and was chosen king of the Romans 27 Nov. 1308, and crowned at Aix-la-Chapelle 6 Jan. 1309. In 1311 he received the iron crown of the Lombards, and 29 June 1312 was crowned emperor at the Lateran. His march into Italy at the head of a Ghibelline army (October 1310) was hailed by Dante, who did homage at some time and place unknown. His sudden death immediately after reception of the Eucharist led to the unfounded rumor that he had been poisoned.

Henry, prince of Portugal, surnamed the **NAVIGATOR**: b. 4 March 1394; d. 13 Nov. 1460. He was a grandson of old John of Gaunt; nephew of Henry IV. of England; and great-grandson of Edward III. His father, King João or John, who formed a close English connection by marrying Philippa of Lancaster, was the first king of the house of Avitz, under which Portugal, for two hundred years, rose to its highest prosperity and power. The career of Portugal in exploration and discovery, due to the genius and devotion of Prince Henry, his biographer characterizes as "a phenomenon without example in the world's history, resulting from the thought and perseverance of one man." Prince Henry had become one of the first soldiers of his age when, in 1420, he refused offers of military command, and undertook to direct, at Sagres (the extreme point of land of Europe looking southwest into the Atlantic Sea of Darkness), plans of exploration of the unknown seas of the world lying to the west and south. His idea was to overcome the difficulties of the worst part of that immense world of storms, that lying west of Africa, and thereby get round Africa to the south and sail to India, and China, and the isles beyond India. Every year he sent out two or three caravels; but his great thought and indomitable perseverance had yielded only "twelve years of costly failure and disheartening ridicule," when, in 1434, the first great success was achieved by Gil Eannes, that of sailing beyond Cape Bojador. Prince Henry made his seat at Sagres, one of the most desolate spots in the world, a school of navigation, a resort for explorers and navigators. His contemporary Azurara says of him: "Stout of heart and keen of intellect, he was extraordinarily ambitious of achieving great deeds. His self-discipline was unsurpassed; all his days were spent in

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hard work, and often he passed the night without sleep; so that by dint of unflagging industry he conquered what seemed to be impossibilities to other men. His household formed a training-school for the young nobility of the country." Consult: Major, 'Life of Prince Henry the Navigator' (1868).

Henry, prince of Prussia, German naval officer: b. Berlin 14 Aug. 1862. He is a brother of Emperor William, and married Princess Irene, daughter of the late Grand Duke Ludwig IV. of Hesse, in 1888. He succeeded Vice-Admiral von Diederichs in command of the German fleet in Chinese waters, in March 1899. In January 1902, Emperor William requested that the president's daughter, Alice, should christen the royal yacht then building in the United States. After receiving the consent of President Roosevelt, the Emperor informed the President that he had ordered his yacht, the "Hohenzollern," to be present at the ceremony, and had appointed his brother, Admiral Prince Henry of Prussia, to represent him on the occasion. The Prince arrived in New York city on 23 February and left on 12 March, after receiving many national, municipal, and social honors.

Henry, surnamed THE LION, duke of Saxony and Bavaria: b. Ravensburg 1129; d. Brunswick 6 Aug. 1195. He was the son of Henry the Proud, and the head of the Guelphs. He greatly enlarged his domains, and so increased in power as finally to become a dangerous rival of the Emperor Frederick I., Barbarossa. His refusal to support Frederick was among the chief causes of the latter's defeat at Legnano (29 May 1176). He was summoned to appear at three diets, and, having failed to attend was placed under the imperial ban (1180). Later he was allowed to retain Lüneburg and Brunswick upon condition of going for three years into exile. He was finally reconciled with Henry VI.

Henry, Alexander, American traveler: b. New Brunswick, N. J., 1739; d. 1824. He joined the Canadian expedition under Amherst against the French (1760) and when peace followed he went to Michilimackinac and engaged in the fur trade. After the massacre of the English by the Indians in that place he being one of the few survivors, remained a captive among the Ojibways at Sault Ste. Marie for 12 months, when he escaped and resumed the fur trade. In the pursuit of this business he traveled between Montreal and the Rocky Mountains. He also interested himself in the copper mines on Lake Superior and for many years made an effort to establish a company for their exploitation.

Henry, Edward Lamson, American painter: b. Charleston, N. C., 12 Jan. 1841. He began his artistic studies at the Philadelphia Academy and in 1860 went to Paris where he studied for three years under Saisse and Courbet. In 1869 he was elected a member of the National Academy. He has frequently revisited Europe for the purpose of sketching the scenery, although his specialty is domestic genre, and history. In the Corcoran Gallery at Washington is one of his most characteristic pictures, which shows his careful grouping of figures, his attention to detail as well as the stiffness of his drawing and his deficiency in the sense of color which recalls Wilkie, whose swing and movement he lacks, though he exhibits some of the humor of

the Scottish master. The picture referred to is a crowded canvas of fifty figures with the title 'Initial Excursion of the First Railway Ever Constructed in New York State.' Among his historical pictures the best are 'Battle of Germantown,' owned by William Astor, 'Declaration of Independence,' owned by J. W. Drexel, and 'Reception to Lafayette.'

Henry, Guy Vernon, American soldier: b. Fort Smith, Indian Territory, 1839; d. Ponce, Porto Rico, 1899. He was graduated at West Point 1861, and went to the front in the Civil War, taking part in four years of the hardest fighting, from Bull Run to Cold Harbor. At 23 he was commissioned colonel of the 40th Massachusetts volunteers. After the Civil War he was transferred to the 3d Cavalry, and in 1874 was in Arizona. He continued his Indian campaign, though severely wounded on one occasion, and compelled to be invalided. He served through the outbreak of the Sioux in 1890, and was also on service at Porto Rico during the Spanish-American War, where he died of typhoid fever.

Henry, Joseph, American physicist: b. Albany, N. Y., 17 Dec. 1797; d. Washington, D. C., 13 May 1878. He was educated at the Albany Academy, after graduation undertook the study of chemistry, anatomy and physiology with a view to adopting the medical profession. During the years 1824-5, he contributed occasional scientific papers to the Albany Institute, his especial subjects being chemistry and mechanics, and was appointed assistant engineer on the survey instituted for a road between Lake Erie and the Hudson. In the spring of 1826 he was elected teacher of mathematics and natural philosophy in the Albany Academy and in the latter part of 1827 read a very important paper before the Albany Institute, 'On Some Modifications of the Electro-Magnetic Apparatus.' He made his first public demonstration of his magnetic discoveries in exhibiting before the Institute small electro-magnets wound with silk-covered wire. These magnets had a greatly multiplied lifting power over any that had yet been known. In this lay the essential point of his first discovery, for he was undoubtedly the earliest physicist to adopt insulated or silk-covered wire for the magnetic coil, and to employ spool winding for the limb of the magnet. He demonstrated also for the first time, by a very intelligent experiment, the difference of action in a quantity magnet excited by a quantity battery of a single pair, and an intensity magnet with a long fine wire coil excited by an intensity battery of many elements, having their resistances suitably proportioned. The first of these two forms was not capable of being employed for telegraphic purposes, while the intensity magnets with their attachments could be so applied. The quantity magnets which he exhibited caused a good deal of excitement in the scientific world. Their attractive power was at that time quite unprecedented. One of them had sufficient power to raise as much as 3,500 pounds.

Henry was the first to show that iron could be magnetized at a distance, and to invent a suitable combination of magnet and battery for the production of this result. In 1831 he made this experimental demonstration. He suspended a mile of insulated copper wire round a chamber in the Academy, and so placed a bell at one extremity of it that it was struck by the polarized

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armature of an intensity battery connected with the other extremity. This was the earliest example of the magnetic telegraph, for the galvanometer or needle had been the principle on which all preceding experiments had been conducted. It was not long after that he invented a machine, and finally constructed it, which is recognized as the first electro-magnetic engine with automatic pole-changer. In 1832 after repeated experiments he discovered how to give greater intensity to a magnetic discharge by the induction of a current on itself in a long spiral or helical wire. These progressive steps in magnetic science gained for him an extended reputation, and soon after the publication of the last experiment in Silliman's 'American Journal of Science' Henry was elected professor of natural philosophy in Princeton College. The discovery of the spiral or helical conductor suggested to him further experiments, and his extended researches and their results were announced by him in a paper published 1834, under the title 'On the Influence of a Spiral Conductor in Increasing the Intensity of Electricity from a Galvanic Arrangement of a Single Pair.' He supplemented these discoveries by many others, and by his experiments produced electrical combinations which were undoubtedly precursors of later relay and receiving magnets, while his demonstration of the conditions and range of induction from electrical currents, and the successive orders of induction in the passage of frictional electricity, as well as his discovery of the oscillatory nature of electricity, paved the way for that great scientific and practical resolution which was to consummate by the genius of Morse and his confrères.

In 1846 Henry was called to a new sphere of activity, in which he exhibited his usual zeal and enthusiasm. The Smithsonian Institution had just come into existence, and during the formative period of the great museum, he was appointed to be its secretary. The office did not so far engross his attention as to make him neglectful of practical work in science. He found time to investigate the acoustics of public buildings, meteorological changes of the atmosphere and methods for telegraphic transmission of meteorological observation from all points of the continent. From 1868 up to his death he was president of the National Academy of Sciences, and of the Philosophical Society of Washington from 1871, when it was first organized.

Henry, Matthew, English Nonconformist clergyman: b. Broad Oak, Flintshire, Wales, 18 Oct. 1662; d. Nantwich, Cheshire, 22 June 1714. In 1686, having qualified himself for the ministry, he began to preach; and in the succeeding year he was settled as pastor to a congregation at Chester, and continued to discharge the duties of his office for 25 years, when he removed to Hackney, London, where his clerical labors were still more extended. Besides his greatest work, 'Expositions on the Bible' (1710), he was the author of 'A Discourse on Schism'; 'A Scripture Catechism'; 'Family Hymns'; etc.

Henry, Patrick, American orator and statesman: b. 29 May 1736, in Hanover County, Va., within a few miles of the birthplace of Henry Clay; d. 6 June 1799, in Charlotte County, Va. His father, John Henry, was a well-educated Scotchman, presiding judge of

the Hanover court. He was a cousin of William Robertson, author of the 'History of the Emperor Charles the Fifth.' Another relative of his was Henry Brougham, the radical Scotch writer, who became lord chancellor of England. Of Patrick Henry's mother, "a portly, handsome dame," a pleasing portrait is left us by William Byrd, of Westover, the genial litterateur of colonial Virginia.

Poor as were the schools in his neighborhood, Patrick seems to have profited little by them. From his uncle, the rector of the parish, he gained a rudimentary knowledge of the classics and mathematics. He was a frolicsome and vagrant youth, fond of hunting and frontier life in general. At 18 years of age, and without money or employment, he married Sarah Shelton, a poor girl of the neighborhood. He kept a store and failed; he tried farming, and failed; then he returned to the store, only to fail again. He now turned to law, and spent a few weeks in reading upon that subject. Having received his license, he began to practise in his native county, while he assisted in the tavern kept by his father-in-law.

In 1763 Henry singled himself out as a born orator by his impassioned plea in "The Parsons' Cause." The king had annulled a statute of the Virginia burgesses, which compelled the clergy to accept the depreciated currency of the colony in payment of their annual salaries, in lieu of 16,000 pounds of tobacco as theretofore, a product which was then selling at a high price. Henry startled the court and the countryside by asserting "that a king, by annulling or disallowing acts of so salutary a nature, from being the father of his people, degenerates into a tyrant, and forfeits all right to his subjects' obedience." Henry's utterance on this occasion was in keeping with the bold address, two years previous, of James Otis, who declared that the tyranny lurking in general search warrants had "cost one king of England his head and another his throne."

Henry became a member of the House of Burgesses in May 1765, just at the time of the arrival of the Stamp Act. Unabashed by his rustic appearance and inexperience in legislative matters, he brought forward a series of resolutions to the effect "that the general assembly of this colony have the only sole and exclusive right and power to lay taxes." In the bloody debate which followed he was "opposed by Randolph, Bland, Pendleton, Nicholas, Wythe, and all the old members, whose influence in the House till then had been unbroken," so we learn from Jefferson, then a college student, who was present at the session of the burgesses. In pleading the injustice of the Stamp Act, Henry used the famous words: "Caesar had his Brutus; Charles the First, his Cromwell; and George the Third ['Treason!'] shouted the Speaker. 'Treason,' 'treason,' echoed others. After a moment's pause, the orator completed the interrupted sentence in a manner that showed no less defiance than adroitness] and George the Third may profit by their example. If this be treason, make the most of it." As the royal governor of Massachusetts wrote the ministry: "The Virginia resolves proved an alarm bell to the disaffected." By his intrepidity, his oratory, and his intuition, at once patriotic and prophetic, Patrick Henry became henceforth the protag-



J. Henry

Univ. Library, UC Santa Cruz 2001

HENRY — HENRY COLLEGE

onist of the colonial cause, sharing with Otis, Gadsden, and Samuel Adams the high honor of launching the American Revolution.

Henry represented Virginia in the first colonial congress, which met at Philadelphia 5 Sept. 1774, when he gave final expression to the feeling of nationality: "The distinctions between Virginians, Pennsylvanians, New Yorkers, and New Englanders are no more. I am not a Virginian, but an American." With this speech compare Christopher Gadsden's remark nine years before at the Stamp Act congress in New York: "There ought to be no New England men, no New Yorkers, known on the continent, but all of us Americans."

On 23 March 1775, Henry, as a member of the second Virginia convention, which met in St. John's Church, Richmond, moved that the colony be armed, and again electrified the patriots with his eloquence in support of this radical measure. "Gentlemen," said he, "may cry peace—but there is no peace. The war is actually begun! The next gale that sweeps from the North will bring to our ears the clash of resounding arms! Our brethren are already in the field!

Is life so dear, or peace so sweet, as to be purchased at the price of chains and slavery? Forbid it, Almighty God! I know not what course others may take; but as for me, give me liberty, or give me death." Col. Edward Carrington, listening at a window in the east end of the church, was so transported by the eloquence of Henry, that he exclaimed, "Let me be buried at this spot," a wish that was respected at his death in 1810. Such was the universal testimony of those present as to the overmastering effect of Henry's speech at that crisis.

On 5 Aug. 1775, Henry was made commander-in-chief of the Virginia troops. In May of that year he had made a dash against Lord Dunmore, on account of the governor's secret seizure of some powder belonging to the colony. Deeming himself slighted by the Committee of Public Safety, which acted during the interim as the executive of Virginia, Henry, with some heat, threw up his military commission, 28 Feb. 1776.

Fortunate was it for the colonial cause that Henry was again at liberty to exert his forensic powers in the councils of the State. Representing Hanover County in the convention which met at Williamsburg 6 May 1776, he contributed greatly to the constructive work of that celebrated body, notably the motion for a declaration of American independence and the framing of a constitution for Virginia. Among the convention papers in the State Library at Richmond were found three endorsed by the clerk, "Rough Resolutions. Independence." William Wirt Henry, after minute comparison of the handwriting of these, concluded that the first was penned by Patrick Henry; the second by Meriwether Smith; and the third by Edmund Pendleton; and that the resolution actually introduced by Nelson was the one written by Henry. On the other hand, Edmund Randolph, who was a member of the convention, says that the resolution declaring for independence "was drawn by Pendleton, was offered in convention by Nelson, and was advocated on the floor by Henry."

On 20 June 1776, the natal day of the commonwealth of Virginia, Patrick Henry was elected governor, took the oath of office 5 July,

and served for three annual terms in succession. As governor he commissioned, on 2 Jan. 1778, Col. George Rogers Clark to enlist seven companies of men for the expedition against the British garrisons in the Northwest Territory. After leaving the executive office, Henry settled in Henry County, on an estate of about 10,000 acres, called Leatherwood, where he lived until he became governor for the fourth time, on 30 Nov. 1784. In the Virginia convention of 1788, which was called to ratify the Constitution of the United States, Henry led the opposition on the ground that such a federal government encroached too far upon the rights of the several States. While the arguments of Madison and the influence of Washington happily prevailed on that critical occasion, Henry was a chief agent in securing the amendments which constitute a bill of rights in the national instrument. His objection to the Constitution was stated concisely in his first speech before the convention: "That this is a consolidated government is demonstrably clear; and the danger of such a government is, to my mind, very striking.

Who authorized them (the framers) to speak the language of *we the people*, instead of *we the States*? States are the characteristics and the soul of a confederation. If the States be not the agents of this compact, it must be one great, consolidated, national government of the people of all the States." Such was his clear discernment of the real nature of the government established by the Constitution of the United States.

S. C. MITCHELL,

President of the University of South Carolina.

Henry, William Arnon, American educator: b. Norwalk, Ohio, 16 June, 1850. He obtained his early education in the Holbrook Normal School at Lebanon, Ohio; studied at Ohio Wesleyan University from 1867-9, and at Cornell University from 1876-80, receiving the degree of B. S. Agr. He was appointed professor of botany and agriculture in the University of Wisconsin in 1881, professor of agriculture in 1883, director of the agricultural experiment station in 1887, and since 1891 has been dean of College of Agriculture in that university. He has had charge, from the beginning, of the agricultural college and experimental station of the University of Wisconsin, which now has buildings valued at \$300,000 and 450 pupils. He has written: 'Rush's Special Report on Diseases of Cattle and Cattle Feeding' (Part II. 1892); 'Handbook on Northern Wisconsin' (1895); 'Feeds and Feeding' (1898), etc.

Henry, William Wirt, American historian and lawyer: b. Red Hill, Va., 14 Feb. 1831; d. 5 Dec. 1900. He was educated at the University of Virginia, and took up the practice of law, later being elected to the legislature for four terms. He preferred, however, historical research to his law practice, and spent much of his time in that pursuit. He was president of the American Historical Association and of the Virginia Historical Society. He is chiefly noted for his 'Life, Correspondence, and Speeches of Patrick Henry' (3 vols. 1890-1).

Henry College, a coeducational institution, founded in 1892, in Campbell, Texas. At the close of 1910 there were connected with the school 12 professors and instructors, with 150

HENRY DOCUMENTS—HENSON

students in attendance. The estimated value of the grounds and buildings is \$125,000.

Henry Documents, 26 letters of 1809 between John Henry and several British officials—Sir James H. Craig, governor of British North America, his secretary Ryland, and the English foreign secretary Lord Liverpool, with related papers. Tempted by the hostility of the New England Federalists to the Embargo (q.v.), and the threats of secession by the extremists, Craig sent the adventurer Henry in January 1809 to sound the people as to reunion with Great Britain. Henry remained till June, and sent back the most extravagant reports of the secession feeling, but the British ministry not paying him as he thought fitting, he sold the copies of the letters and other documents to the United States government in February 1812 for \$50,000. Madison used them to hurry forward the War of 1812, by sending them to Congress on March 9 with a special message, in which he accused Great Britain of attempting to dismember the Union by intrigue and annex the North to itself. So far as the New Englanders were concerned, however, the papers contained nothing incriminatory of secession movements.

Henry Phipps Institute, The, for the study, treatment, and prevention of tuberculosis, was founded at Philadelphia, 1 Feb. 1903 by Henry Phipps. The incorporators were Henry Phipps, George E. Gordon, Lawrence F. Flick, Miss Amy Phipps, and S. P. Harbison. The scientific work of the Institute, is in the hands of a medical staff, consisting of a medical director, an assistant medical director, clinicians, bacteriologists, and pathologists. In the Institute's organization there are a number of paid fellowships open to any member of the staff and a number of honorary fellowships open to any person throughout the world who has done distinguished work in the cause of the study, treatment, or prevention of tuberculosis. The eleemosynary work of the Institute contemplated is the care of the consumptive poor in their homes, the care and treatment of consumptives in hospital beds, and the care and treatment of consumptives in a sanatorium. Consumptives in their homes are to be cared for and treated through a dispensary. The patients come to the dispensary where they are prescribed for and given medicines and supplies for the prevention of tuberculosis. They are instructed in preventive measures, and during the intervals between their visits to the dispensary are supervised in the carrying out of these instructions by a visitor from the dispensary. The consumptive who is entirely destitute and who cannot be cared for in his home even with such assistance as can be given is brought into the hospital and treated as a ward of the Institute. The scientific work of the Institute contemplated is education in preventive measures, study of the disease, dissemination of knowledge about the disease among physicians, stimulation of effort on the part of scientific men throughout the world, and encouragement of workers in the cause. This work is to be pursued through lecture courses, laboratory and clinical experiments, distribution of literature, organization of the workers in the cause of prevention of tuberculosis, and public receptions to persons who have done distinguished work. The Institute will seek to aid

all workers in the crusade against tuberculosis. It will act as a bureau of information and with this end in view will index literature on the subject of tuberculosis and collect objects of various kinds which have a bearing upon the prevention or treatment of the disease. The Institute has inaugurated an international course of lectures by the foremost workers in the crusade against tuberculosis. One lecture a month is given during the fall and winter months. The Institute will publish annually a report of its work which will be distributed gratuitously to the libraries of the world.

LAWRENCE F. FLICK,
Of the Henry Phipps Institute.

Henschel, Georg, gä-örg' hën'shël, German composer and concert singer: b. Breslau, 18 Feb. 1850. He began his musical education under the pianist Moscheles, the contrapuntist Richter, and the vocal teacher Gosse in the Conservatory at Leipsic. In 1870 he sang with great success at the Beethoven celebration at Weimar, and toward the end of the same year went to Berlin to complete his studies in musical science and vocalization. He met with a brilliant reception in his professional tour through Cologne, Düsseldorf, and the lower Rhine provinces, and his fame spread over all Germany, Austria, Holland, and Russia (1874-7). He was received with immense applause in London, and crossing the Atlantic was appointed musical director in Boston (1883-5); when he returned to London and became teacher of singing in the Royal College of Music. He wrote among his numerous compositions many songs and duets, such as 'Wanderlieder'; 'Duette in Kanonform,' 'Serbisches Liederspiel'; etc. He married in 1881 Lillian Jane Bailey (d. 1901) a well known American singer.

Hensley, Sophia Almon, American lecturer and author: b. Nova Scotia 31 May 1866. She studied in England and Paris, and moved to New York in 1880. She has been interested in the study of social problems and actively identified with the work of the 'Mother's Congress.' She has served as president of the Society for the Study of Life in New York city and as vice-president of the New York City Mothers' Club, and lectures frequently. She is author of 'Woman's Love-Letters' and 'Souls.'

Hen'son, Herbert Hensley, English Anglican clergyman: b. London 8 Nov. 1863. He was graduated at Oxford and elected fellow of All Souls College in that university 1884. He was head of the Oxford House at Bethnal Green, 1887-8, and since 1900 has been canon of Westminster Abbey and rector of St. Margaret's. He has attracted wide attention as a fresh and powerful preacher by his utterances on national topics of social and political interest, and among his published works may be noted: 'Light and Leaven' (1897); 'Cross Bench Views of Current Church Questions' (1902).

Henson, Josiah, American negro slave and clergyman: b. Port Tobacco, Md., 1787; d. 1883. His early life was one of great hardship, but he finally escaped to Canada (1828), where he became a Methodist clergyman with a charge at Dresden, Bothwell County, Ontario. He also

lectured in the United States. Upon the story of his slave career was based the character of Uncle Tom in Harriet Beecher Stowe's 'Uncle Tom's Cabin' (1852).

Henty, George Alfred, English writer of novels and stories for boys: b. Trumpington, Cambridgeshire, 8 Dec. 1832; d. Weymouth, Dorsetshire, 16 Nov. 1902. He was educated at Westminster and Cambridge; he went to the Crimea during the war with Russia, and served there in the purveyor's department of the army. Soon afterward he went to Italy to organize the hospitals of the Italian legion. As special correspondent of the *Standard* newspaper he went through the Austro-Italian, Franco-German, Turco-Servian, Abyssinian, and Ashanti campaigns, besides accompanying Garibaldi in the Tyrol. He described two of these campaigns in the works 'The March to Magdala' (1868) and 'The March to Coomassie' (1874). He wrote eight novels, among which are: 'A Woman of the Commune' (1895); 'The Queen's Cup' (1897); and 'Colonel Thordyke's Secret' (1898); but he is much more widely known as the author of a large number of stimulating stories of adventure for boys, many of them based on famous historical events. Among these are: 'The Young Franc-Tireurs' (1871), a story of the Franco-German war; 'The Young Buglers,' a tale of the Peninsular War (1879); 'In Times of Peril,' a tale of India (1881); 'Under Drake's Flag' (1882); 'The Lion of the North' (1885); a story of Gustavus Adolphus; 'With Lee in Virginia' (1889); 'By Pike and Dyke' (1889), a story of the Dutch War of Independence; 'In the Irish Brigade' (1900); and 'Out with Garibaldi' (1900).

Hepatica, a genus of plants, the liverworts, of the crowfoot order (*Ranunculaceæ*), closely related to *Anemone*. The best-known species is *H. hepatica*, found wild throughout North America as well as Europe in woods, and widely cultivated for its attractive and fragrant star-like blue, white, or purple-red flowers, which open in early spring. It is, indeed, the earliest of American spring flowers. Sometimes even under the snow its buds, well wrapped up in a warm down, lie upon the broad, furry liver-shaped leaves, awaiting the first warmth to induce them to open. In the southern Alleghanies its leaves are dried and steeped into a medicinal tea. A more southern species is *H. acuta*.

Hepburn vs. Griswold, 1869: the great case in which the Supreme Court of the United States decided that the government had no power to make its own notes legal tender; reversed through a change in the constitution of the court in *Knox v. Lee and Juilliard v. Greenman*. Mrs. Hepburn of Kentucky had given Henry Griswold a note for \$11,250 "dollars," payable 20 Feb. 1862; it was not paid when due, and five days subsequently the government passed the act authorizing \$150,000,000 in notes (see **GREENBACKS**), receivable for public and private debts. In 1864 Griswold brought suit in the chancery court of Louisville for principal and interest; \$12,270 in greenbacks was tendered in settlement, but refused, on the claim that the act did not extend to debts contracted before its passage. The court decided

for Mrs. Hepburn; Griswold carried the case to the Kentucky court of appeals, which reversed the decision; Mrs. Hepburn carried it to the Supreme Court, which on account of the far-reaching importance of the case, and at the request of the attorney-general, laid it over till 1868, when it was reargued, and finally decided in the December term 1869. Chief Justice Chase, for five justices against three, decided that the act extended to all debts, contracted as well before as after its passage, and that the question therefore must be whether the government had the power to make anything but coin a legal tender; that it could not do so, under the Constitution, because at the time of its adoption no money but gold and silver was recognized; that as paper money never rose above coin and almost always fell below it, each particle of depreciation was so much abstracted from the value understood by the parties to the contract, and was therefore an unlawful deprivation of private property; that the power of Congress to use "necessary means" to carry out its power of making war did not convey this right, because this was no more a special means of carrying out war powers than any other powers, and would enable it to issue bills of credit and make them legal tender just as much in the post-office business or the patent business as the war. The minority admitted that it was so impairing the obligation of contracts, but asserted that Congress was given the power to do so; and this is now law. See **LEGAL-TENDER CASES**.

Hephæstus, *hē-fēs'tus*, a god of the ancient Greeks, identified by the Romans with their Vulcanus. He presided over fire, and was the patron of all artists who worked in iron and metals. He was the son of Zeus (Jupiter) and Hera (Juno). Homer says that his mother was so disgusted with the deformities of her son, that she threw him into the sea as soon as born, where he remained for nine years. He afterward returned, but for taking the part of his mother on one occasion against Zeus was thrown down by the latter a second time. He was a whole day in passing from heaven to earth, and fell in the island of Lemnos. He broke his leg by the fall, and ever after remained lame of one foot. He fixed his residence in Lemnos, where he built himself a palace, and raised forges to work metals. The Cyclopes of Sicily were his ministers and attendants; and with him they fabricated not only the thunderbolts of Zeus, but also arms for the gods and the most celebrated heroes. His forges were supposed to be under Mount Ætna, in the island of Sicily, as well as in every part of the earth where there were volcanoes. Aphrodite (Venus) was the wife of Hephæstus. Her infidelity is well known. Her amours with Ares (Mars) were discovered by Phœbus, and exposed to the gods by her own husband. He appears on some monuments with a long beard, disheveled hair, half naked, and a small round cap on his head, while he holds a hammer and pincers in his hand.

Hep'tarchy, seven Anglo-Saxon kingdoms into which England was at one time or other supposed to be divided, although the kingdoms were founded at different times, and at no one time were they all independent monarchies together. In 827 King Egbert of Wessex united

HEPTASOPHS — HERALDRY

them into one kingdom, and claimed the title King of England. See ENGLAND.

Hep'tasophs, Improved Order of, a benefit society, organized in 1878 as an independent branch of the Order of Heptasophs (q.v.). At the time of secession the Heptasophs had not adopted the benefit system. The constitution and ceremonies are identical with those of the parent order. At the close of 1910 it had 1,102 conclaves, a membership of 74,656, and since its organization had disbursed in benefits nearly seventeen million dollars.

Heptasophs, Order of, a benevolent society in the United States founded in New Orleans 1852 by Alexander Leonard Saunders, and other Freemasons, originally called "The Seven Wise Men." The ritual of its ceremonial is elaborate; the membership of each chapter is seven, or a multiple of that number. In 1872 the adoption of a death benefit system was agitated, and the discussion led to the secession in 1878 of the Zeta Conclave of Baltimore, which organized the Improved Order of Heptasophs (q.v.). In 1880 the Order of Heptasophs adopted the benefit system. Members must be white males and profess a belief in the Supreme Being. Their number in 18 States amounts to about 4,000.

Hep'worth, George Hughes, American clergyman, journalist, and author: b. Boston 4 Feb. 1833; d. 7 June 1902. He was brought up a Unitarian, and after leaving the Harvard Divinity School held Unitarian pastorates at Nantucket, Boston, and New York. He advocated preaching in theatres and conducted theatre meetings in various cities, but being not wholly at ease in the Unitarian denomination, entered the Congregationalist ministry in 1872. He subsequently quitted the ministry and became attached to the editorial staff of the New York *Herald*. He published: 'The Whip, Hoe, and Sword' (1864); 'The Criminal, the Crime, the Penalty' (1865); 'Starboard and Port' (1876), record of a yacht cruise; a book entitled 'I I P'; 'Rocks and Shoals'; 'Brown Studies'; 'Hiram Golf's Religion'; 'They Met in Heaven'; 'Through Armenia on Horseback' (1899). Consult S. H. Ward, 'George H. Hepworth; the Story of his Life' (1903).

Hera, hē'rā or -rē, a mythological goddess of the Greek pantheon, identified by the Romans with their Juno, the sister and wife of Zeus (Jupiter), and daughter of Kronos (Saturn) and Rhea (Cybele). The poets represent Zeus as a faithless husband, and Hera as a violent, jealous and vindictive wife. She was worshipped in all Greece, but her principal seats were at Argos and at Samos. The companions of Hera were the Graces and Hours. Iris, a personification of the rainbow, which seems to stretch from heaven to earth, was her messenger. Her usual attribute is a royal diadem. The temples built in her honor were called *Hēræa*. The principal one was at Argos, which city was considered to be especially under her protection. She is represented by Homer as taking the part of the Greeks in the Trojan war, being actuated by revenge for the slight passed on her by the Trojan Paris, who gave the golden apple inscribed "To the Fairest" not to her, but to Aphrodite.

Her'acles. See **HERCULES**.

Heracli'tus, Greek philosopher: b. Ephesus, who flourished about 513 B.C. He traveled in different countries, particularly in Africa. On his return to Ephesus he was offered the chief magistracy, but refused it. He left a work on nature, in which he treats also of religion and politics. Some fragments only of this work remain. He is considered as belonging generally to the Ionic school of philosophers, though he differed from it in important particulars. He considered fire as the first principle of all things, describing it as an ethereal substance, "self-kindled and self-extinguished," from which the world is evolved (not made) by a natural operation. It is also a rational principle, and the source of the human soul. Phenomena exist in a constant state of flux, always tending to assume new forms, and finally returning again to their source.

Heraclius, hēr-ā-klī'ūs, Roman emperor of the East, from 610 to 641: b. Cappadocia about 575 A.D. He was the son of Heraclius, exarch of Africa, who had gained great renown by his victories over the Persians, the elder Heraclius of the East was applied to by a powerful body of insurgents to claim the throne for himself. This he declined, but sent his son Heraclius to do so. Heraclius the younger therefore ascended the throne, and though he undoubtedly possessed considerable talents, the Roman Empire in the East was tottering to its fall, and nothing he was able to do could save it. Before his death Mohammed had carried his victorious arms on every side, and Syria, Palestine, Mesopotamia, and Egypt had fallen under the dominion of the caliphs. He was permitted, however, to die in peace, and to transmit the succession to his son, who mounted the throne under the title of Constantine III.

Heraldry is the whole group of ceremonial duties discharged by the heralds of a court, an army, a great noble, or the like, with the assistance of their pursuivants, and under the direction of the Earl Marshal, King-at-Arms, the College of Arms, or other chief of the confraternity. These duties are generally divisible into heraldry proper, or the business of regulating ceremonial occasions such as coronations, marriages among princes, proclamations of important events, and the like; and armory, or the art or quasi-science of armorial bearings. In the first of these divisions but little remains of any interest at the present day, for only in Great Britain is the herald of any consequence. There, however, he still has some direction, as at the eventful proclamation of 1 Jan. 1877, when the Queen of Great Britain assumed the title of Empress of India. In the second branch of the subject, the order and marshaling of arms, the Germans are perhaps at the head of modern writers, though the English and Scottish treatises on the subject are more numerous and more widely used. The Germans' thoroughness of investigation has marked their treatment of this subject, which is eminently a branch of mediæval and subsequent history serving to elucidate genealogical research.

Modern heraldry is no older than the tournaments of the Middle Ages. No linking evidences of the science occur during the Dark Ages, although badges and emblems are found

or shields and helmets discovered in the ruins of antiquity, while in Biblical times the men of Israel were directed to pitch their tents, every man by his own camp and standard with the ensigns of his father's house. Greek and Roman writers describe devices on shields and helmets; the golden eagle on the shields of the kings of Media; the standards and brilliantly colored shields borne by the ancient Germans in battle. The office of herald is as ancient as that of priesthood. Spartans, Greeks, and Romans had heralds, the Roman officers being divided into three classes: *caduceatores*, heralds of peace; *fetiales*, heralds of war and peace; and *præcones*, judicial criers or messengers. The *caduceator* on a mission carried a wand of laurel or olive (*caduceus*, q.v.), as a symbol of his office and for his security. The *fetiales* are thought to have had a college of 20 members founded by Numa, who formulated the procedure and ceremonies connected with the declaration of war and the making of treaties. The *præcones* were employed to proclaim matters of public interest to the people at religious ceremonies, in the *comitia*, at public sales, judicial trials, in the senate, on the publication of laws which they read, at funerals, at games, in the army when a general wished to address his men, at executions, and at all public meetings. The heralds of the Middle Ages had duties which in part resembled those of the heralds of antiquity. Thus, they carried messages of peace and of defiance, and yet even in the earlier years of feudality their office was an inferior one, they being replaced by ambassadors, diplomats almost in the modern sense, statesmen in whose suite the heralds and pursuivants went to the foreign court. So it was that the chief duty of the herald came to be the care of armories.

The first known tomb or monument with escutcheons in the period of modern history is stated to be the eleventh century tomb in the Church of St. Emmeran at Ratisbon, where are the bearings of Varmond, a count of Vaserburg; but this may be a later addition. Another very old specimen and certainly genuine is the shield at Le Mans of Geoffrey Plantagenet, who died in 1150. The use of coats of arms seems to have first become general in the 12th century. Rolls of arms in England are extant in the reigns of Henry III., Edward I., and Edward II. Surcoats displayed armorial bearings in the reign of Henry III. The Roll of Caerlaverock, a poem in Norman-French, contains the names and armorial bearings of the knights and barons who attended Edward I. at the siege of the Castle of Caerlaverock, Dumfriesshire in 1300, and exhibits heraldry already in a developed form. On coins also, no armorial ensigns are found till the 13th century; but then both coins and the seals of nobles and monasteries display them; the use of arms on the Great Seal of England was introduced by Richard I.

The study of armory became essential when at mediæval tournaments aged knights were appointed, whose duties were to act as arbiters, and to pass judgment on coats of arms and the right of knighthood. Whenever a new knight appeared at a tournament, the herald had to *blasen*—that is to blow—the trumpet, and proclaim and explain the bearing of his shield or coat of arms. Hence to *blasen* (*blasen*)

came to mean, to describe and explain a display of bearings. The heralds were also the chroniclers of the times and were present on all occasions of public ceremony. In France the first herald—*roi-d'armes*—was crowned and consecrated with religious ceremonies, and was called *Montjoie*, from the war-cry of the French royal armies. The heralds were united in associations, and their duties formed a branch of science which was communicated only to the members. If any person pretended to the character of a herald, who on examination was found not to belong to the corporation, he was driven away with insults and frequently with violence. The heralds in modern courts are masters of ceremonies. In England there are now three kings at arms; the highest is the Garter king at arms; the second, known as *Clarencieux*, is for the southern counties; the third, styled *Norroy*, for the northern provinces. These three kings at arms with six subordinate heralds and four pursuivants form under the presidency of the Earl Marshal, always the Duke of Norfolk, the herald's college or herald's office, established in 1340. The use of arms by private persons in the British Isles was forbidden by proclamation in the reign of Henry V. All persons who had not borne arms at Agincourt were prohibited from assuming them unless by hereditary descent, or with the sanction of the constituted authorities. Periodical circuits called visitations were held afterwards by the provincial heralds to take cognizance of the arms, pedigrees, and marriage of such as were entitled to the use of armorial bearings. These visitations continued till about the end of the 17th century; their records, many of which are preserved in the British Museum and elsewhere, contain much genealogical information and are still consulted for evidence of the hereditary right to bear arms.

The practice of *blazoning the arms* is frequently referred to in the poetry of the Troubadours of the 12th and 13th centuries. Those knights who asserted a right to appear at tournaments did so by the blazoning of their arms, and from the Germans this custom was transmitted to the French, for tournaments were held in Germany before they became general in France. The French, however, carried to far greater perfection the tournament, and the blazon of heraldry connected with it, as they did the whole system of chivalry; the French language prevailing at the court of England after the Norman Conquest, pure French expressions came to be preserved in British heraldry. German heraldry, on the contrary, contains almost pure German expressions.

The whole display of any person's arms is called an achievement, also spelled *atchievement*. Only the escutcheon, however, is of vital importance. This is the broad surface upon which the bearings are charged. It is always assumed to be a shield in the case of a man not an ecclesiastic; but churchmen's arms are charged upon an oval or other architectural form, a sort of cartouche, and women's bearings are charged upon a lozenge set vertically. The arms of husband and wife, however, may be charged on a shield divided vertically in the middle, and are then said to be dimidiated or impaled; thus we might say that such an escutcheon bears the arms of Smith impaling the arms of Jones—Smith and Jones standing

for the two spouses. It is rare to charge the wife's arms unless she was an heiress, that is to say, the owner of real estate in her own right. These rules, however, are those of Great Britain; they differ widely in other countries.

A single escutcheon may be complete with one simple division. Thus, a horizontal line divides the chief or top of the field at one third of its height from the remainder of the field. If that chief is, say, of gold, while the rest of the field is blue, that by itself makes a very respectable and honorable heraldic statement. The chief is one of the honorable ordinaries, and others are almost as simple. They are the pale, the vertical stripe in the middle of the shield and one third of its width; the fess, a horizontal stripe; the bend, which goes diagonally from the left hand upper corner to the right hand lower part, stopping against the rounded border of the shield; the bend sinister, which is a bend turned the other way (but see below, dexter and sinister); the chevron, which is a pair of stripes meeting in the middle, forming a figure like the letter A without the cross-bar; the cross, the two arms of which are usually of one quarter the width of the escutcheon; and the saltire, which is a diagonal cross. A shield upon which there is any one of these honorable ordinaries and nothing else, is most respectable. In general the simpler shields are the older; thus the old family Erskine, with a black pale on a silver field, or the family of Beauchamp with a gold fess on a red field, occupy the most enviable position in having such a plain escutcheon. There are ordinaries of the second rank, such as the quarter or canton, the orle, and besides these there are very many bearings in common use, especially those which are diminutives of the honorable ordinaries. Thus, the pallett is a smaller pale, and the shield of Aragon has four red palletts side by side on a gold ground. These again may be used to charge upon the greater ordinaries. Thus, the escutcheon of Loreyn bears a blue bend sinister on a gold field and the bend itself is charged with three golden six-pointed stars. That also is a simple and presumably ancient armory.

In describing the escutcheon the side on the left of the spectator is called the dexter and that on his right is called the sinister side; that is because the shield, when carried on the arm with the man-at-arms behind it would be to him so disposed. The escutcheon is supposed to be divided into a certain number of imaginary points or divisions for the fixing and placing of the bearings when they are described in words. When there are nine points, the three at the top following each other from the dexter to the sinister side are dexter chief, middle chief and sinister chief, and a similar nomenclature is used throughout. A modern and fuller arrangement is to give eleven points, the honor point interposed between the top horizontal row and the middle one; and the nombril point spaced between the middle row and the lowermost one. A small bearing as a mullet (a five-pointed star) may be located as being in the dexter chief or the like.

The main business of armory is to present simple patches of bright colors which can be recognized at a great distance. The tinctures used in Great Britain are nine—two metals,

or and argent (gold and silver); five colors, gules (red); azure (blue), sable (black), vert (green), purple (purple); though this last is very rare and green is not very common. There are also two furs, which are represented by curious conventional patterns supposed to represent the patchwork of small skins sewed together which make a garment or the lining of a garment. These furs are ermine and vair, but each has many curious variations known by different names. Thus "ermine" shows black tails on a white field, or in modern times a flower-like pattern suggested by the real ermine; but erminois has the same pattern in black on a gold field.

Dimidiation and impaling, mentioned above, are varieties of the great general subject of marshalling. The more elaborate form of marshalling is to divide an escutcheon into quarters. Thus, the son of a married pair who have borne their arms impaled, may divide the escutcheon into four quarters and will put his father's arms on the first and fourth quarters (dexter chief and sinister base) and those of his mother on the second and third quarters. This quartering may be quartered again, and so on indefinitely. Thus, the escutcheon of the Prince of Wales during the reign of Queen Victoria (of him who is now King Edward VII.) is too elaborate to describe fully here. This is because his bearings as Duke of Rothsay, Lord of the Isles, Duke of Cornwall, Baron Renfrew, and the like are all charged together, so that the number of small subdivisions is remarkable. Now, there are different ways of charging these. Those which his escutcheon must bear are the royal arms of England differenced (see differencing above) with the label of the heir apparent, which is a label of three points argent, and this escutcheon will bear in the middle a small shield with the arms of Saxony. Even in this the inescutcheon is out of place when we are considering his arms as heir to the crown. It is held by many that the Prince of Wales should display two shields: the first as simple as possible, with only the quarters for England, Scotland, and Ireland; while the second should display all his primary and secondary arms, including those of his wife, who, in the case assumed above, was the Princess Alexandra of Denmark. Again, a system is adopted by which a large shield bears those royal arms upon it, an inescutcheon with the secondary arms of Cornwall, Rothsay, Chester, Dublin, Lordship of the Isles, Carrick, Renfrew, Wales as a principality, and over all a small escutcheon of pretense charged with the arms of Saxony for Saxe-Coburg-Gotha. But even these do not include the arms of the Princess, his wife, which should rightly occupy the sinister side of the shield, while all the achievement described above should be charged upon the dexter side. It is evident, then, that a person whose family has formed many dignified alliances may have an indefinitely great number of quarterings. But let us take the escutcheon of a king of the House of Hanover, as George IV., and we shall find that the four quarters of the shield are filled in this way: the first quarter (dexter chief) in gules, bearing three lions passant guardant, and the fourth quarter (sinister base) exactly the same. These two quarters are England. The second quarter (sinister chief) is Scotland, a field or

with a lion *rampant gules*, framed in a *bordure fleur-de-lise*, also *gules*. The third quarter (dexter base) is Ireland, the Irish harp or on a ground *azure*. Upon this shield is set an *inescutcheon*, divided in a curious way into three parts, for Hanover, and having above it a royal crown. Upon this *inescutcheon* is still a second *inescutcheon*, very small, simply *gules* with a bearing or, which is supposed to stand for the imperial crown of Charlemagne, this in commemoration of the electoral dignity of the sovereign of Hanover, who was called the elector until after the Napoleonic wars. It is a rule never to place metal upon metal or color upon color. Thus, if your shield is *argent*, any bearing put upon it must be in one of the colors—never in *or*. But there is one curious exception; that of the Latin Kingdom of Jerusalem (which lasted only from 1099 to 1187, but which is perpetuated by the addition of its bearings to many private shields) was *argent*, a cross potent between four crosses *or*. This means a large gold cross, at the end of each arm of which is a cross head like the handle of a crutch; and in the little corners left by the cross, four small Greek crosses; all these in gold on a silver ground.

No two persons should bear the same arms at the same time, therefore a distinction is made between the *escutcheons* of younger children. Even the heir may distinguish his bearings from his father's by a special mark, apart from the quartering described above. The term marks of cadency is used for these distinctions. Many different plans have been followed, and one which has been much accepted is the label. This is a band with pendant strips hanging from it, usually three; and this is laid right upon the *escutcheon* near its head, and crosses it, partly concealing all the bearings. This label will be plain for the oldest son, differenced by a bearing like a crescent, or, a mullet for the second son, another bearing for the third son, and so on.

The practical functions of the herald developed into blazoning, historifying, passing judgment on, and marshalling coats of arms. Blazoning is the methodical description of a bearing. In the first place the shield is described according to its tinctures, figures and partitions. The inferior parts of an *escutcheon* are then blazoned—the helm with its insignia which are trumpet, wings and plumes, men and animals, or their members; then the wreath and its tinctures; after which the coronet, cap, etc.; finally the supporters, the mantle, the device and other secondary addenda. To historify in heraldry is to explain the history of a coat of arms, its origin, and the changes it has undergone. If the herald is to explain a bearing historically, he must show that this figure is the proper emblem of the family or country. He derives, for instance, from historical sources the proof that the double-headed eagle of the German king was first introduced in the beginning of the 14th century under Albert I., and that previously from the time of Otho II. the royal eagle had but one head; and he records the privilege given to wear that eagle on a private *escutcheon*. So he shows that the three leopards (lions passant gardant) in the English arms were first derived in 1127 under Henry I. from the Norman house. The marshalling of arms is especially important in the

preparation of new *escutcheons*. In this matter, the herald either follows the orders of the sovereign, or he invents the idea, and makes the plan of the *escutcheon* according to his own judgment, or he composes a new *escutcheon* from several coats of arms.

When color is not used, a system of conventional expression is substituted; thus, *argent* is plain white, or is white with black dots, *azure* by horizontal black lines on white, *gules* by vertical black lines, *sable* by crossing black lines horizontal and vertical, *vert* by lines from the dexter chief to the sinister base, *purpure* by lines from the sinister chief to the dexter base. The furs have peculiar patterns and surfaces of their own.

The crest is the highest part of an achievement of arms and is set above the *escutcheon*. It is called crest from the Latin word *crista*, which signifies a comb or tuft, such as many birds have upon their heads. Crests were anciently marks of honor, because they were worn only by heroes of valor and high rank that they might be the better distinguished in an engagement, and thereby rally their men if dispersed; or else they were of the nature of badges worn by all the followers of a chieftain and serving to identify them. They are at present considered as mere ornaments; and they may be assumed without authority; obviously they should not be used by women. Supporters are figures placed on each side of the shield and perhaps originated from the custom of pages in fantastic dresses guarding the achievements of arms of their masters while the latter were taking part in the exercises of the tournament. The scroll is an ornament usually placed below the shield and supporters, containing a motto or short sentence alluding to the crest, or to the bearing or to the bearer's name. The motto had its origin in the war cries of knights, though in some instances mottoes were borne differing from the war cry of the wearer. The badge is not subject to heraldic rule, though it may be a part of the heraldic achievement, used separately. The porcupine was the badge of Louis XII. of France, and the salamander was chosen by Francis I. when he came to the throne, but neither of these was included in the *escutcheon* or worn as a crest. The reader may consult Palliser, 'Historical Devices, Badges, and War Cries' (London 1870). The most recent large and important book on heraldry in English is 'The Art of Heraldry,' by Arthur Charles Fox-Davies, which is based upon the *Heraldischer Atlas* of H. G. Ströhl. An excellent book for persons who are making a serious study of the matter is Berry's 'Encyclopædia Heraldica,' in three volumes, n. d. (about 1820). The treatise on Heraldry by Woodward and Burnett, two volumes, 1892, is a very full and up-to-date manual. Smaller books are numerous. To name English ones alone Cussan's 'Handbook of Heraldry,' Planche's 'The Pursuivant at Arms,' Worth's 'Practical Heraldry,' and especially Charles Boutell's two books, 'English Heraldry,' second edition, 1871, and the very remarkable essay, 'Heraldry, Historical and Popular,' third edition, 1864, now scarce, but nevertheless the most suggestive book that can be found.

Revised by RUSSELL STURGIS.

HERAT—HERBART

Herat, hër-ät', Afghanistan, a city in the northwest near the Heri-Rud River, about 370 miles west of Cabul. It is enclosed by a broad deep moat and an earthen mound surmounted by a lofty wall of unburned brick, and defended by a strong citadel. The caravansaries, public baths, and mosques are numerous. The trade, almost entirely in the hands of Hindus, is greatly favored by the situation of the town on the great thoroughfare from India westward. Herat was long the capital of the empire founded by Tamerlane, and was once much larger and more splendid than now. Its possession has been repeatedly contested among the peoples of central Asia, and, being regarded as a key to Afghanistan on the side next Persia and Russia it is of great importance politically. Its capture by Persia in 1856 led to a short war between Britain and Persia. Pop. about 45,000.

Herault de Sechelles, sâ'shêl, **Marie Jean**, French revolutionist: b. Paris 1760; d. there 1794. He became imbued with the teachings of Diderot, but, after his election to the Legislative Assembly in 1791, being rather a philosopher than a revolutionist, he at first paid little attention to the radical element there. He soon, however, joined the extreme left, and later on supported Danton in the revolution of August and September 1792. He was a deputy from the department of Seine-et-Oise to the Convention of 1792 and voted for the king's death. He became a member of the Committee of Public Safety, and as such gained the enmity of Robespierre, who claiming that he had betrayed certain secrets to the army of the Rhine, caused him to be arrested and executed. His best writings were published under the title '*Voyage à Montbard*' (last ed. 1890).

Herb Paris, a poisonous plant of the lily family (*Paris quadrifolia*), resembling and related to white hellebore (q.v.), the toxic principle of which is a specific alkaloid called paradin.

Herbarium, a collection of dried plants, leaves, and fruit or seeds, arranged for preservation between sheets of bibulous paper; it is sometimes called *hortus siccus*, "dry garden," and is an indispensable adjunct to the apparatus of the systematic botanist, and microscopist. The most famous public herbariums are those of Kew, London; those of the British Museum and the London Linnean Society. Those in Paris, Leyden, Berlin, and Vienna are also very full and complete.

In the United States there are three herbaria both copious and of the first order, namely, the Gray Herbarium of Harvard University, the Herbarium of the New York Botanical Garden, and the United States National Herbarium at Washington. The first named contains a vast majority of the older types of American plants, and the last contains the material brought together by the government collectors and many of the most important collections of the early Government surveys. There are also important collections at the Missouri Botanical Garden (Saint Louis) and the Field Columbian Museum (Chicago).

Herbart, Johann Friedrich, German philosopher: b. Oldenburg, 4 May 1776; d. Göttingen, 11 Aug. 1841. His career is evidence of the fact that at least some men may live peaceful

lives in stormy times. A student at Jena under Fichte, a tutor in Switzerland, a docent at Göttingen in the theory of education, and after that a professor to the end at Göttingen, at Königsberg, and finally at Göttingen again,—that is the story of his life. But if he took no part in the revolutionary tumults that afflicted his country, he at least became a leader in her intellectual contests. His metaphysics stands at the opposite pole from that of Hegel. His psychology laid the foundations for modern psychophysics and experimental psychology, while his pedagogics is still the source of much of our best educational theory and practice.

Metaphysics.—The turning point between Herbart and Hegel lies in the use to be made of the principle of contradiction. Herbart took the orthodox stand that what contradicts itself cannot be truly real or actual, whereas Hegel boldly incorporated the principle of contradiction as a stage in what might be called his dialectic of evolution, which follows the formula, thesis, antithesis, synthesis. The antithesis is the contradiction of the thesis, but only that the two may come together again in a higher synthesis. A familiar illustration is the relation of (1) being, (2) non-being and (3) becoming, in which the second is thought as the contradiction of the first, while the third is conceived as a higher synthesis of the first two, since becoming has elements both of being and of non-being. Herbart, however, rejects such reasoning as insufficient, and demands that philosophy shall accept the validity of the principle of contradiction, and honestly endeavor to remove the contradictions inherent in our everyday thought of the world. Such contradictions are encountered when we consider a thing and its attributes or the ego, which is both subject and object, or when we trace experience back to matter, in which the notions discrete and continuous are seen to be at variance. The effort to remove the contradictions leads Herbart back to a pre-Kantian method of speculation, for he holds himself ready to accept any sort of a presupposition, rational, or irrational, which promises to resolve the difficulty, even though the principle of explanation should forever resist demonstration as to its reality. In other words, we may assume anything to be true which clears up our thinking. But this is the method of Leibnitz, of Spinoza, and of many others antecedent to the time of Kant (q.v.). The fundamental form in which contradiction appears is that the simple is conceived as manifold. For example, the thing we call water is at the same time thought of as heavy, fluid, colorless, having the quality of quenching both fire and thirst, and as being capable of transformation from a liquid to a solid or to a vapor. The way to overcome this contradiction is to assume a plurality of simple beings, and to explain the manifold as appearances arising from their relations. These simple beings that underlie the phenomenal world are atoms, or monads, or as Herbart prefers to call them, *Reals*. They are conceived to be in mechanical interaction, and to give rise to the manifold we have in experience. Like the atoms of Democritus they are simple and

alike in quality, but unlike the monads of Leibnitz they are not points of self-active force, containing an inherent principle of development. Why and how the *Reals* act and interact Herbart does not explain, not even how they get and exercise their one function of *self-preservation*. The inability to explain these things which we most want to know is the penalty attached to this type of metaphysics. Yet it would be unfair to assume that no good results can come from even such pre-suppositions. The *Reals* are not spatial in the ordinary meaning of that term, for space and time as we know them are themselves phenomenal products, but they may be conceived to be in what Herbart calls *intelligible space*, in which the *Reals* exist in a state of partial or total interpenetration. Here they reciprocally "disturb" one another, a "self-preservation" resulting, which is a "state" of the *Real*. When the *Real* which is "disturbed" happens to be a soul, the disturbance, or the state of self-preservation, becomes an *idea*, which is the primary form of mental life. Psychology is, therefore, the science of these self-pervations of the soul-monad, which is like all *Reals* unknowable, but as Herbart thinks a necessary presupposition of our experience. Psychical life is the reciprocal tension of ideas. Consciousness depends upon the degree of this tension. The lowest degree of strength which an idea can have and still be actual marks the threshold of consciousness. If reduced below this degree it remains as "*impulse*," and may rise again when freed from "*arrest*." The soul monad has its seat in the brain and is in intimate interaction with a multitude of other *Reals*. Outwardly originating stimuli are conveyed to the brain by the nerves and reach the soul through the medium of the other *Reals* present. Since the idea is the primary form of mental life, feeling and volition must be explained through an examination of the inhibitory relations of the ideas. Pleasure arises when there is a furthering of mental movement, and pain when there is an arrest. Volition arises from desire, a state of feeling, which has a natural impulse to find satisfaction through action. Since mechanical action and reaction of the *Reals* is the source of ideas, it seems a natural conclusion that there may be a statics and mechanics of mental states. This led to Herbart's attempt to work out the calculus of ideas, thus opening the road for the modern quantitative study of mental phenomena, as seen in psychophysics and experimental psychology. Herbart claims to have founded psychology anew upon metaphysics, mathematics, and experience. The third of these bases is treated under the term *apperception*, which has important results for education.

Apperception.—Leibnitz, who introduced this term, employed it in a double sense. Its first meaning is the original power of the mind to unify experiences originating in sensation; this is the sense in which Kant uses the term. The second meaning is the mental assimilation that takes place when we use knowledge already acquired to interpret new knowledge. It is natural that Herbart should emphasize the latter

process, for though he could hardly deny the validity of the first form of apperception, yet so slight is the original equipment of the mind—merely the power of preserving itself against the encroachments of other *Reals*—that all the significance of its activity must be found in acquiring experience. This, it may be remarked, is the process most important to teachers, for they can help to supply and order experience, whereas they have no control whatever over the original constitution of the mind. Herbart sees in each new sensation a stimulus to ideas already possessed; an attractive force for the similar, a repelling one for the dissimilar. The new idea therefore at first holds the centre of consciousness, gathering about itself similar ideas, and repelling hostile ones already in consciousness or newly attracted to it by contrast. But this very domination of the new idea is in most cases the cause of its reduction to a subordinate place, for by bringing to consciousness a body of more deeply rooted related ideas, it enables the old to control the new by placing the new in its true relation to older and better ordered experience. In other words, the new is apperceived by the old. Herbart's theory, thus briefly stated, has been extended and freed from contradictions, by subsequent writers, notably Lazarus, Steinthal and Wundt (qq.v.).

Ethics.—All knowledge, feeling, desire, and will, being explained by the various relations into which ideas may come, there is no room in Herbart's system for transcendental will, hence no ethical imperatives antecedent to those developed by experience. Ethics consequently becomes a branch of aesthetics, and ethical judgment is founded upon pleasurable or painful feelings as the case may be. The mind spontaneously approves some will relations and as spontaneously disapproves others. These basal relations refer to five fundamental aspects of conduct, two relating to the self as such, and the remaining three to the relations of the self to others. The first two are *Inner Freedom* (the feeling that arises from good conscience) and *Efficiency of Will* (the pleasure that is aroused by efficient action). The three other ideas are first *Good Will* (subjective attitude toward others), the second *Justice* (the legal basis of rights), and the third *Equity* (the demand that requital shall be adequate to deed).

Education.—Upon the basis of his psychology and ethics as above explained, Herbart built his educational structure. Since there is no source of character but experience, it is to experience, i.e., to organized knowledge or groups of ideas, that we must look for the development of character, which thus has its roots, not in a single department of knowledge as, e.g., that grounded in sacred writings, but in the whole content of the mind. A man must be ethical all over, not in spots only. For this reason the Herbartians speak fondly and proudly of *educative instruction*, meaning thereby such instruction as shall render all ideas contributory to moral character. But since feeling is the bridge between cognition and volition, this bridge the teacher must induce the pupil to cross if his conduct

is to be adequate to his knowledge. This leads to the

Doctrine of Interest.—By means of direct interest incited in the pupil for the subject-matter itself, not amusement connected with the subject-matter, as some have erroneously thought, the pupil's permanent attitude of mind toward the circle of thought itself and consequently toward the aspects of life involved will be established. This interest falls naturally into two groups, first that pertaining to knowledge itself, and second that pertaining to intercourse with others. The first group embraces empirical, speculative (causal), and æsthetic interests; the second sympathetic, social, and religious interests. This doctrine of interest, so important in modern educational thought, has been brought into harmony with our more spiritualistic systems of philosophy and psychology by Professor John Dewey ('Interest as Related to Will'). The next important topic arises when we ask how the teacher is to lead the pupil to build his circles of thought adequately, and then to have the right mental attitude toward them. This leads to the subject of

Method.—It is a common experience that faulty methods may easily lead to inadequacy of insight; they may still more easily lead to the wrong attitude of mind, as when the student hates a subject and everything connected with it. The first point to consider is *Attention*, which is either spontaneous or forced. With the young where forced attention is painful, it is better to induce spontaneous attention, for here the ideas rise freely, producing liveliness and pleasure. Apperception has two marked stages, that of *absorption*, in which the mind gives itself up to new impressions; and that of *reflection*, in which the newly acquired elements of knowledge find their appropriate place in the systems of the old. To bring about this twofold process of absorption and reflection most effectively and most agreeably to the mind, we must observe at least four prominent stages of method. The first of these is *clearness*, by which is meant the adequate apprehension of the single object or element as such. The second is *association*, which consists in the progress from one absorption to another related one. The third is *system*, or the step in which each part of that which is learned finds its proper place in relation to other parts. Steps two and three may be said to embrace the process of generalization. The fourth stage is what Herbart calls *method*, by which he understands the well-ordered activity of the pupil in the solution of problems and tasks.

Making due allowance for those parts of Herbart's system that are now of historical interest only, it may be seen that many of its elements are still of importance to the world, for they involve the most potent of modern educational processes and aims.

Herbart's chief philosophical works are 'Lehrbuch zur Einleitung in die Philosophie' (1813); 'Lehrbuch zur Psychologie' (1816); 'Psychologie als Wissenschaft, neu gegründet auf Erfahrung, Metaphysik und Mathematic' (1824-25); 'Allgemeine Metaphysik nebst den

Anfängen der philosophischen Naturlehre (1828-29); 'Kurze Encyclopädie der Philosophie, aus practischen Gesichtspunkten entworfen' (1831). The complete works of Herbart have been edited in 12 volumes by G. Hartenstein (Leipzi 1850-52). Herbart's aducational works, including the 'Allgemeine Pädagogik' and the 'Umriss Pädagogischer Vorlesungen,' were edited by Dr. Otto Willmann in two volumes (Leipzig 1880). The Psychology is translated and to be found in the International Series (Appletons), while the 'Allgemeine Pädagogik' and the 'Umriss' are also found in English; the former under the title of the 'Science of Education,' and the latter under that of 'Outlines of Educational Doctrine.' The Herbartian School has produced a literature in metaphysica, psychology and education too voluminous for mention here.

CHARLES DE GARMO.

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Herbelot, Barthelemy, d', bär-täl-mē dër-blō, French Orientalist: b. Paris 4 Dec. 1625; d. there 8 Dec. 1695. Having gone through a course of study in the university of his native city, he applied himself particularly to the eastern languages; with a view to the elucidation of the Hebrew Scriptures. He visited Italy, and while there commenced his great work, the 'Oriental Library.' Recalled to Paris by Colbert, a pension was given him, that he might be at liberty to proceed with his undertaking. It was his first design to have published his collection in Arabic, and types were cast for the purpose of printing it. But the death of Colbert having interrupted this plan, he recomposed the work in the French language, as likely to prove more generally useful. He was appointed to the royal professorship of Syriac in 1692. His book was published in 1697, under the title of 'La Bibliothèque Orientale.' The best edition of the 'Oriental Library' is that of The Hague (1777), with the supplements of Galland and Visdelou.

Herbert, Edward, LORD HERBERT OF CHURBURY, English philosopher: b. Eyton-on-Severn, near Wroxeter, 1583; d. London 20 Aug. 1633. He was a famous soldier and diplomatist in his day, but at the present is remembered as an author and philosopher. At Paris, in 1624, he printed his famous book, 'De Veritate prout Distinguitur a Revelatione, a Verisimili, a Possibili et a Falso,' the object of which was to assert the sufficiency, universality, and perfection of natural religion, and thereby prove the uselessness of revelation. In 1624 he returned from France, and was created an Irish peer; and in 1629 became an English baron with the title of Lord Herbert of Churbury. In the civil war he at first tried as far as possible to play a neutral part, but afterwards sided with the Parliamentary party chiefly with a view, it appears, to save his property. The character of Lord Herbert is strongly marked in his memoirs, which show him to be vain, punctilious, and fanciful, but open, generous, brave, and disinterested. The 'De Veritate' was followed by works entitled 'De Causis Errorum' (1635);

HERBERT

and 'De Religione Gentilium' (1663; Eng. trans. 1709). In 1649 was published his 'Life and Reign of Henry VIII.' The English style of Lord Herbert is strong, manly, and free from the quaint pedantry of his age. He was one of the first to attempt a systematic proof of the sufficiency of natural religion. "Herbert's religious doctrine," says Sidney Lee, "starts with the assumption that religion, which is common to the human race, consists merely of the five innate ideas or axioms that there is a God, that He ought to be worshipped, that virtue and piety are essential to worship, that man ought to repent of his sins, and that there are rewards and punishments in a future life. He regards Christianity as on the whole the best religion, because its dogmas are least inconsistent with his five primary articles." His autobiography remained in manuscript till 1764, when it was published by Horace Walpole. There is a recent critical edition by Sidney Lee (1886).

Herbert, Lady Elizabeth, English writer, mother of Sir Michael Herbert, British ambassador at Washington 1902-3. She is well known as an authoress, and has written books of travel in Spain, Algeria, and many other countries, as well as novels and biographies. Among these may be noted: 'Rambles Round the World'; 'Wayside Tales'; 'Cradle-Lands'; 'Impressions of Spain'; 'Algeria, or Search After Sunshine'; 'Love and Sacrifice'; 'Thekla'; 'Edith'; 'Wives and Mothers in the Olden Times'; 'First Martyrs of the Holy Childhood in China'; 'Children of Nazareth'; 'Lives' of Monsignor Dupanloup, Garcia Moreno, Alexis Clerc, General de Stonis, the Archbishop of Braga, Geronimo, Père Eymard, Ven. Clement Hofbauer, Saint John Baptist de Rossi, Saint Cajetan, Mother Teresa Dubouché, Père Peract, etc.

Herbert, George, the best known of English religious poets: b. at the Castle of Montgomery, Wales, 3 April 1593; d. Bemerton, March 1633. His father, Richard Herbert, came of an illustrious Welsh family; his mother, Margaret Newport, also of excellent family, is more remembered for her own noble character. She was of the best type of Renaissance woman, cultured, highminded—the companion and friend of intellectual men. Between her and her poet son was rare sympathy; she guided his life in all things and early destined him to the saintly career in which he came slowly to find his happiness. Upon her husband's death in 1597, the care of her ten children fell to her. The oldest son, Edward, Baron Herbert of Cheshire, himself a poet and the author of the famous autobiography (printed by Horace Walpole in 1764), went to Oxford in 1595; there his mother followed him with her other children, to watch over his career. Here George Herbert was brought up until 1605, when he entered Westminster School. From the first he distinguished himself, partly by his learning, partly by his daring, which showed itself in his attack in Latin epigrams upon Andrew Melville, the noted Presbyterian. In 1609 he was elected scholar of Trinity College, Cambridge, where three years later he took his degree. In 1614 he became a Fellow of Trinity, and won his Master's Degree in 1616. In 1619 he was elected Public Orator, an office he filled until 1627.

Until this election Herbert had looked toward a worldly career. Pride of family and ambition were strong in him; the influence of his relatives and friends at court was great; he knew his own powers. But all that the court favor bestowed upon him was the lay rectorship of Whitford (1623), a sinecure post which Sir Philip Sidney had held; and shortly afterward the death of his most powerful friends darkened the promise of worldly advancement, and aided his mother's effort to turn him to the Church. In July 1626, while yet a layman, he became prebendary of Layton Ecclesia, in the diocese of Lincoln. With the help of his mother and others, he restored the ruined church building—an act more expressive perhaps of the beauty-loving courtier than of the future parish priest.

His mother had married Sir John Danvers in 1609. Her death in 1627 called forth Dr. Donne's famous funeral sermon and her son's 'Parentalia.' This sorrow marks the beginning of George Herbert's nobler life. Shattered in health, and threatened with consumption, he resigned his oratorship and spent the next three years in London and Essex and Wiltshire, communing with himself and with his friends.

In 1629 he married Jane Danvers, a relative of his father-in-law's, and the next year he was presented to the living of Bemerton, with which his name is remembered. The short remainder of his life was remarkably active. In these years he wrote most of his poems and the best of them, and also the charming "Character of the Country Parson." It has been thought that his extraordinary zeal hastened his end. He died of consumption in 1633; the date of his burial was March 3. Later in the same year his famous book of poems, 'The Temple,' was published in Cambridge.

Herbert's life must have seemed to him an elaborate and delayed preparation for the last saintly years at Bemerton—one long turning from high hopes of a career and broad experience of the best of worldly society, to the humble life of the spirit. The wasting of his physical frame paralleled this increasing otherworldliness. Yet in his final achievement his early life counts for more than at first might be guessed; he could turn from such a past less completely than he thought. He owed it to this broad experience of the world at its best that his nature remained normal. His extreme saintliness took no strange outward form, as did the piety of his friend Nicholas Ferrar, nor did it mar his writing with eccentricities of fervor or mysticism; his genius is entirely sane. In no English poet, religious or secular, do the small common-places of life count for more. In such poems as 'The Elixir,' with its famous praise of "Drudgery Divine," he insists on that kind of aspiration which scorns no humble or routine task; and his longest poem, 'The Church Porch'—a series of wise maxims for the familiar discipline of the soul—sums up the moral and religious traditions of the English race, though in his individual way. His genius is for common sense ennobled by lofty faith and passionate devotion. It is this normal quality in him, this quickness to find inspiration along the highway, rather than his frequent reference to ecclesiastical customs and offices, that makes him, as Coleridge said, the representative poet of the English Church.

Herberts' wide fame rests on the substance of his work, rather than on the skill of its expression. But technically in his own field he is an accomplished artist. In a certain striving to crowd too much thought into words or to secure a striking phrase, he must be classed with Donne and the other "fantastic poets," but in him this quality is rarely pressed beyond a charming quaintness. He has the artist's sense of word-values; his verbal felicity, as in the oft-quoted "Sweet day, so cool, so calm, so bright," could hardly be excelled, and in many of his poems the fine openings and cadences recall the best manner of the Cavalier Poets (q.v.), among whom Herbert would naturally have found his place, had he not devoted his genius to sacred poetry. Good illustrations of such qualities, besides the titles already mentioned, are the song "I got me flowers to straw Thy way," the lovely poem with the fantastic title 'The Pulley,' and the more passionate 'When blessed Mary wiped her Saviour's Feet.' In all these verses Herbert's individuality is strong—the quiet depth of his religious nature, and his indescribable sweetness of temper, the fruit of the winning over of his worldly ambition to saintly ideals.

Bibliography. — The best editions are: George Herbert Palmer; Grosart, in the Fuller's Worthies Library and in the Aldine edition; the Pickering edition, with the Life by Isaac Walton. For criticism, consult: 'Introductions' to the above, especially to Palmer's edition; also, for a charming study, consult the essay on Lady Danvers in Louise Imogen Guiney, 'A Little English Gallery.'

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Herbert, Henry William, "FRANK FORESTER," American author: b. London, England, 7 April, 1807; d. New York 17 May 1858. He was graduated from Caius College, Cambridge, in 1828; removed to the United States in 1831; and until 1839 was instructor in the Greek and Latin languages in a private school of New York. In 1833 he established and until 1836 was editor of the 'American Monthly Magazine,' during a portion of that time with Charles Fenno Hoffman (q.v.) as associate. From 1834 he became largely known as the first important American writer on sports and out-of-door subjects. He wrote also on French and English history, and made excellent translations from Dumas and Sue. His volumes include: 'Cromwell' (1837); 'Marmaduke Wyvil' (1843); 'The Cavaliers of England' (1852); 'The Chevaliers of France' (1853); 'The Puritans of New England' (1853); 'Field-Sports of the United States and the British Provinces' (1848); 'Sporting Scenes and Characters' (1857); 'Horses and Horsemanship of the United States and British Provinces' (1859).

Herbert, Hilary Abner, American lawyer and politician: b. Laurensville, S. C., 12 March 1834. He was educated at the universities of Alabama and Virginia, studied law and was admitted to the bar. He began practice at Greenville, Ala., but served in the Confederate army as captain and colonel of the 8th Alabama

regiment; being disabled at the battle of the Wilderness (1864), he retired from the army, and continued the practice of his profession, first at Greenville, then at Montgomery (1872). He was elected to Congress in 1877, and seven times re-elected; in three Congresses he was chairman of the committee on naval affairs. In March 1895, he was appointed secretary of the navy by President Cleveland, an office which he held till 1897.

Herbert, John Rogers, English historical and portrait painter: b. Maldon, Essex, 23 Jan. 1810; d. London, 17 March 1890. He studied at the Royal Academy, where he exhibited as early as 1830; later went abroad and in 1840 became a Roman Catholic, after which the subjects of his paintings were chiefly religious. In 1841 he was elected one of the masters of the government school of design at Somerset House, and in 1846 became a member of the Academy. His principal works are the frescoes in the peer's robing-room in the House of Lords; 'The Appointed Hour' (1834); 'King Lear Disinheriting Cordelia'; 'Sir Thomas More and his Daughter' in the Vernon collection at the National Gallery; and 'Saint Gregory Teaching His Chant.'

Herbert, Sir Michael Henry, English diplomatist: b. England 25 June 1857; d. Davos-Platz, Switzerland, 30 Sept. 1903. He went to Paris as attaché in 1879; was *charge d'affaires* at Washington (1888-9); secretary to the British legation at Washington (1892-3); at The Hague (1893-4); and at Constantinople (1894-7). On 4 June 1902 he was appointed British ambassador to the United States at Washington, in succession to the late Lord Pauncefoot, and the following year was compelled by ill health to return to Europe.

Herbert, Victor, American musical director and composer: b. Dublin, Ireland, 1 Feb. 1859. After studying music from his childhood in Germany, he was appointed principal 'cello player in the court orchestra, Stuttgart, from which time he appeared in concerts throughout Europe. In 1886 he took the position of solo 'cellist in the Metropolitan orchestra, New York, and has since been connected as soloist and conductor with the principal orchestras of the United States. Since 1894 he has been bandmaster of the 22d regiment band, New York, was conductor of the Pittsburg, Pa., orchestra from 1898 to 1904, and since 1904 has conducted Victor Herbert's New York Orchestra. As a composer he has written: 'The Captive,' an oratorio; and the comic operas, 'Prince Ananias'; 'The Wizard of the Nile'; 'The Serenade'; 'Cyrano de Bergerac'; 'The Ameer'; 'The Viceroy'; 'The Idol's Eye'; 'The Fortune Teller'; 'The Singing Girl'; 'Babette'; 'Babes in Toyland'; 'It Happened in Nordland'; etc.

Herbivora, a group of mammals characterized by their herbaceous diet; the grazers or ruminants. The term is no longer in use.

Herbs, Culinary, fragrant or aromatic plants used to add flavor to food, especially stews, soups, dressings and salads. They usually owe these qualities to essential oils, which, being readily soluble or easily volatilized by heat,

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quickly permeate the mass of food in which they are mixed. The seed of some, as caraway, anise (qq.v.) and dill, is employed; the foliage of others, as parsley, sage, thyme, is more frequently used. The former plants are cut and placed loosely upon sheets as soon as the seed reaches maturity; allowed to dry a few days; lightly thrashed and the seed cleaned; still further dried and stored in air-tight packages. The latter are gathered just before the first blossoms would open, because they are then richest in flavor. With parsley the leaves are gathered as soon as mature, several cuttings being made in a season. They are then dried upon trays at a temperature below 120 degrees and in freely circulating air until crisp, when they are rubbed to powder and stored as above. Paper or paste-board packages are bad, because they allow the flavors to escape. Both seeds and leaves may be used in decoction, being covered with vinegar or alcohol in stoppered bottles. Fresh herbs, which are always preferable to dried or decocted, are especially useful in salads; dried and decocted in dressings, stews, etc., and at seasons when fresh ones cannot be obtained. In the United States the species most in demand are parsley, sage, thyme, savory, marjoram, spearmint, dill, fennel, tarragon, balm and basil (qq.v.) in nearly the order named. Parsley is beyond question the most popular because of its double use as a garnish and flavoring plant but sage is perhaps more frequently used in the latter capacity. It is most esteemed with pork, goose, duck, and similar rich meats. Spearmint is used mainly with roast lamb; tarragon with boiled fish; dill with pickles; and the other kinds mentioned with mild meats, such as turkey, chicken, veal, venison, etc. The kind, quantity and mixture used with each sort of food depends upon personal preference.

In general, herbs are of simplest cultivation. They usually prefer rather light, moderately rich, well drained soil, and sunny exposures. Since the seeds of many are small or slow to germinate they are frequently started in a greenhouse, hotbed or window, and transplanted to the garden when they are large enough and when conditions are favorable. Clean cultivation and the removal of weeds is essential. The perennial kinds, such as sage, are often propagated by stem cuttings, divisions or layers; tarragon always thus because it does not produce seed; spearmint usually by cuttings of the rootstock. The great majority are grown as annuals, being replaced each spring with fresh plants. Commercially they follow such crops as early cabbage, peas, etc., thus permitting a double use of the same soil annually. They are easily grown for winter use in the borders of benches in the greenhouse or in boxes placed in sunny windows.

Consult articles such as *Sweet Herbs* by Kains in Bailey's 'Cyclopedia of American Horticulture' (New York 1900-2).

Herculaneum, hĕr-kū-lā'nē-ŭm, or **Herculanium**, Italy, an ancient buried city, about five miles southeast of Naples. Strabo says it was first occupied by Oscans, afterward by Tyrrhenians and Pelasgians, and then by the Samnites. It took part in the social war against the Romans. In the time of Sulla it was a *municipium* and a fortified town. It was situated between Neapolis and Pompeii, on elevated

ground between two rivers, and its port was one of the best on the coast. It suffered in 63 A.D. in the same earthquake that nearly destroyed Pompeii. In the greater irruption of 79 A.D. it was buried under a volcanic tuff formed of sand and ashes, partly consolidated by the agency of water. The site of Herculaneum, though well described, had been long sought in vain, when in 1713 three female statues (now in the Dresden Museum) were found in digging a well at Portici, a village situated on the ancient site. After this discovery further excavation was prohibited by the government, until in 1738 the well was dug deeper, and the theatre of Herculaneum was discovered. In 1750 a long, narrow passage, sloping down into the theatre, was opened, and is still the only way by which travelers descend to examine this structure. The excavations were continued more or less industriously for 50 years; but comparatively little progress was made, as the work was difficult and also dangerous to the houses in the populous villages of Resina and Portici, situated above. As soon as one part was excavated and explored it was filled up with the rubbish from a new digging. The theatre is the only building to be seen underground, and it is encumbered with the supports built to sustain the rock above it. It is a noble edifice, massively built of solid stone, and seated 8,000 persons. Bronze statues of Drusus and Antonia and of the Muses were found in various parts of the building. In a square on the south of the theatre a temple was found which was connected with another temple, to the east of it, by a wide street lined with porticoes. One of these temples, dedicated to the mother of the gods, had been restored by Vespasian after the earthquake of 63 A.D. On the north of the theatre was a basilica 228 feet long and 132 broad, surrounded by a portico of 42 columns, and adorned with paintings. Many beautiful paintings and works of art were removed from these buildings to the museum at Naples. A sumptuous private villa was disinterred, containing a number of statues, and in one of the rooms a quantity of papyrus manuscripts. Some of the statues are excellent as works of art, such as those of Agrippina, Aristides, the Sleeping Faun, and the Mercury. Other precious relics discovered here, and now in the museum, are busts of Plato, Demosthenes, Scipio Africanus, Augustus, Seneca, etc., beautiful mosaics, and articles of furniture. New excavations were carried out in 1828-37, and since 1868. The chief discoveries made were those of the forum, a small and elegant temple, a basilica, a dilapidated building supposed to have been an inn, dwelling-houses, tombs, etc. One of the houses discovered at Herculaneum contained a quantity of provisions, dates, chestnuts, large walnuts, dried figs, almonds, prunes, corn, oil, pease, lentils, pies, and hams, none of which had been disturbed for 18 centuries, for the doors remained fastened, in the same state as they were at the period of the catastrophe which buried the town. The internal arrangement of the house, and the manner in which it was ornamented, proved that it had belonged to a rich family, admirers of the arts; for it contained many pictures, vases, articles in glass, bronze, and terra-cotta. Few skeletons comparatively have been found either in Pompeii or Herculaneum, so that it is probable most of the

inhabitants saved themselves by flight. At the door of a villa in Herculaneum were found two, one of which held a key in one hand, and in the other a bag with coins and cameos. Near them were silver and bronze vessels.

Among the most interesting objects discovered here are the papyri above mentioned, over 1,750 of which are now in the Naples Museum. The rolls are of cylindrical form, and much charred. Hardly a third of them have been unrolled. The process presents great difficulties, from the tendency of the MSS. to crumble. One of the works is a treatise by Epicurus on Nature; there are some writings of Philodemus, a Syrian philosopher; but on the whole they are of little value. There have been published 11 volumes of the 'Volumina Herculensia,' containing engraved transcripts of the unrolled papyri (folio, Naples, 1793-1855), and since 1861 several volumes of a continuation of the same.

Consult: Furcheim, 'Bibliografia di Pompei, Ercolano e Stabia'; Ruggiero, 'Storia degli Scavi di Ercolano.'

Her'cules, hēr'kū-lēz, called by the Greeks **HERAKLES**, and also **ALCIDES**, al-sī'dēz, after his grandfather, Alcæus: a mythological hero of Greece, typified by poets, sculptors, and artists of later ages, as a model of human perfection, physical and mental. According to the traditions of the heroic age, he united the finest qualities of mind and heart, as understood at that period, with the highest development of bodily vigor, and under a ceaseless succession of labors and sacrifices, strove perpetually after divine excellence. His indomitable perseverance was crowned with victories which showed the triumph of the divine part of man's nature over the earthly, while his death secured him immortality, a seat among the gods, and the homage of divine honors.

The legends relate that he was the son of Zeus or Jupiter, king of the gods, and of Alcmena the Theban, daughter of Alcæus, son of Perseus. Knowing that the child born on a certain day would rule over the descendants of Perseus, Hera or Juno, wife of Jupiter, consumed with jealousy, contrived to prolong the travail of Alcmena, and hasten that of the wife of Sthenelus, another son of Perseus, who gave birth to Eurystheus, subsequently chief of the Persidæ. Hercules was brought up at Tirynthus, or according to Diodorus, at Thebes. Jupiter sought to protect his favorite son in every manner, and to make him worthy of immortality. On one occasion, while Juno was asleep, he laid the infant on her breast, that he might feed on the milk of the goddess. She awoke, and cast the hated babe from her, and the drops that then fell from her are said to have formed the Milky Way. Under the care of Amphitryon, Alcmena's husband, Hercules received the best instruction in all arts. Castor, the son of Tyn-darus, taught him how to fight; Eurytus, archery; Autolycus, driving; Eumolpus, singing; Linus, to play the lyre; and under the centaur Chiron, he perfected his training, and became the most valiant and accomplished hero of the age.

In his eighteenth year he slew a huge lion in the neighborhood of Mount Cithæron which had preyed on the flocks of Amphitryon and of the king of Thespiis. The king, desirous that his 50 daughters might have children by such a

hero, entertained him at his court for 50 days, and Hercules became the father of their sons, the Thespiadæ. Hercules next freed his native city from the annual tribute of a hundred oxen, paid to Erginus, king of the Orchomenians. Creon, king of Thebes, rewarded Hercules by giving him his daughter Megara in marriage, and intrusting him with the government of his kingdom. Subjected to the power of Eurystheus owing to priority of birth, the latter acquainted with Hercules' successes and rising power, ordered him to appear at Mycenæ, and perform the labors which he was empowered to impose upon him. Hercules refused, and Juno to punish him, afflicted him with melancholic madness, during which he killed his own children by Megara, supposing them to be the offspring of Eurystheus. When he recovered he was so horrified by the misfortunes which had proceeded from his disobedience and insanity, that he consulted the oracle at Delphi; he was told that he must be subservient to the will of Eurystheus and perform ten labors imposed by the king, after which he would attain immortality. Hercules thereupon went to Mycenæ, where Eurystheus, apprehensive of so powerful an enemy, commanded Hercules to achieve a number of enterprises, the most difficult and arduous ever known. The favors of the gods, however, had completely equipped him for their performance; from Minerva he had received a coat of arms and helmet, a sword from Mercury, a horse from Neptune, a shield from Jupiter, a bow and arrows from Apollo, and from Vulcan a golden cuirass and brazen buskin with a celebrated brass club.

The first labor was to destroy the lion which infested the forests of Nemea and Cleonæ near Mycenæ, and was invulnerable to mortal arrows. Hercules attacked him with his club, chased him to his den, and after a sharp and fierce struggle choked him to death. He carried the dead beast on his shoulders to Mycenæ, and ever after clothed himself with the skin. The second labor was to destroy the Lernaean hydra, which he accomplished with the assistance of his friend Iolaus, who burnt with a hot iron the root of each head as Hercules crushed it to pieces with his club. The third labor was to catch the hind of Diana, famous for its swiftness, golden horns, and brazen feet. The fourth labor was to bring alive to Eurystheus a wild boar which ravaged the neighborhood of Erymanthus. In this expedition he destroyed the Centaurs, and caught the boar by closely pursuing it in the deep snow. In his fifth labor Hercules was commanded to clean the stables of Augeas, where 3,000 oxen had been kept for many years; this he accomplished in one day by turning the rivers Alpheus and Peneus through the stables, receiving as payment a tenth of the cattle, and concealing the fact that he had been commanded to perform the service. The sixth labor was to destroy the carnivorous birds, with brazen wings, beaks, and claws, which ravaged the country near Lake Stympthalis in Arcadia. In his seventh labor he brought alive into Peloponneseus the wild bull, a gift of Poseidon to Minos, king of Crete, which had laid waste the island. In his eighth labor he was commissioned to capture the mares of Diomedes, which fed upon human flesh. He killed Diomedes, and gave him to be eaten by his mares, which he brought to

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Eurystheus. For his ninth labor he was commanded to obtain the girdle of the queen of the Amazons. In his tenth labor, he killed the monster Geryon, king of Gades, and brought to Argos his numerous flocks, which fed upon human flesh. Adjudging the second and fifth labors as unlawfully performed, Eurystheus imposed two others. These were: the eleventh, to obtain the golden apples from the garden of the Hesperides; and the twelfth, to bring from hell the three-headed dog Cerberus. Pluto promised him Cerberus on condition that he should use no weapons but force. Eurystheus, pale with fright when Hercules brought the monster to him, ordered its immediate removal. This ended what are generally known as the Twelve Labors of Hercules, and relieved the hero from bondage.

Besides these, Hercules achieved other labors equally great and celebrated, such as his war with Jupiter against the giants, his expedition with the Argonauts to Colchis, the pillage of Troy, the liberation of Prometheus and Theseus, etc. During three years' slavery, imposed by the Delphian oracle for plundering the temple to avenge supposed neglect, Hercules' mistress, Omphale, queen of Lydia, married him. Hercules afterwards married Dejanira, daughter of Ceneus, king of Ætolia, and when Iole, daughter of the king of Oechalia, a princess formerly refused to Hercules, became his captive, Dejanira sent Hercules the tunic given her by the dying centaur Nessus, as having the power to recall a husband from unlawful love. The tunic had been infected by the poisoned arrow shot by Hercules at the centaur, when he offered violence to Dejanira, after carrying her across the river Evenus. When Hercules put the tunic on, the poison penetrated his system and he suffered untold torments; in remorse Dejanira killed herself. In his agony Hercules had himself conveyed to Mount Ceta and laid on a funeral pyre which at his commands was set on fire. In the midst of a dark cloud, accompanied by lightning and thunder, his immortal spirit was transported to Heaven, where he took his place among the gods, became reconciled to Juno and married her daughter Hebe.

While the myth of Hercules is of Greek origin, counterparts of the legend appear among many nations. Some scholars regard Hercules as a solar hero, and the twelve labors to represent the 12 zodiacal signs. Artists represent him under a variety of forms, as a child, a youth, and man, in his numerous adventures and exploits. The principal ancient statue is the Farnese Hercules at Naples, by the Athenian Glycon. In the Vatican, the Torso di Michelangelo, so called because that artist studied it during several years, is a remarkable fragment of an ancient statue of Hercules.

Hercules, in astronomy, one of Ptolemy's northern constellations. It is within this constellation that the point toward which the sun, with its accompanying system of planets, is traveling at present is situated. The constellation contains the finest globular cluster of stars in the northern heavens, and the bright double and variable star Ras Algethi.

Hercules-beetle, a very large South American lamellicorn beetle (*Dynastes hercules*). An enormous horn projects from the prothorax of

the male, and a smaller one from the head; they act together like a pair of forceps. The length of the male is about six inches, but the female is smaller and lacks the horns. Numerous related species are known, of which *D. tityrus*, found in the southern United States, is $2\frac{1}{2}$ inches long.

Hercules' Club, a North American shrub or tree growing to height of 12 feet and sometimes to 40 feet. See **ARALIA**.

Hercules, Pillars of, name of the Straits of Gibraltar among the ancients. Hercules is said to have erected a pillar on each side of the strait between Europe and Africa, upon the mountains Calpe and Abyla, as the limits of his wanderings toward the west. The earliest Greek writer by whom the Pillars of Hercules are mentioned is Pindar. On the other hand the Phœnicians called the strait the Pillars of Melkart (q.v.), whom the Greeks knew as Melicertes.

Herder, Johann Gottfried von, yō hān gōt frēd fōn hēr'dēr, German critic and poet: b. Mohrungen, Prussia, 25 Aug. 1744; d. Weimar 18 Dec. 1803. He was the son of a poor schoolmaster, but friends procured him an appointment in Frederick's College, where he was at first tutor, and at a later period instructor. During this period he became known to Kant, who permitted him to hear all his lectures gratis. His unrelaxing zeal and diligence enabled him to become acquainted with science, theology, philosophy, philology, natural and civil history, and politics. In 1764 he was appointed an assistant teacher at the cathedral school of Riga, with which office that of a preacher was connected. In 1769 he went to Paris; he became traveling tutor to the Prince of Holstein-Oldenburg, but in Strasburg he was prevented from proceeding by a disease of the eyes; and here he became acquainted with Goethe, on whom he had a very decided influence. Herder had already published his 'Fragments on the More Modern German Literature' his 'Critical Woods' (Kritische Wälder) etc., which had gained him a considerable reputation, though he had not published anything of importance in theology; yet, while in Strasburg, he was invited to become court preacher, superintendent, and consistorial counsellor at Bückeburg, whither he proceeded in 1771. He soon made himself known as a distinguished theologian, and in 1776 received an invitation to become court preacher, general superintendent, and consistorial counsellor at Weimar. This appointment was through the influence of Goethe. In 1801 he was made president of the high consistory, a place never before given to a person not a nobleman and was subsequently made a noble by the Elector of Bavaria. As a theologian Herder contributed to a better understanding of the historical and antiquarian part of the Old Testament. His 'Geist der hebräischen Poesie' is highly valued. He did much for the better appreciation of the classical authors, and his philosophical views of human character are full of instruction. His greatest work is his 'Ideen zur Philosophie der Geschichte der Menschheit' (1785 et seq.). In poetry Herder effected more by his various accomplishments, his vast knowledge, and fine taste, than by creative power; yet he has produced some charming songs; and

his 'Cid,' a collection of Spanish romances into a kind of epic, is one of the most popular poems of Germany.

Heredia, José Maria, Spanish-American poet: b. Santiago de Cuba 31 Dec. 1803; d. Toluca, Mexico, 7 May 1839. He was graduated from the law department of the University of Havana in 1819; for taking part in the attempted revolution of 1823 was banished from Cuba, lived for two years in the United States, and in 1825 removed to Mexico, where he held various civil, judicial, and journalistic positions. His poetic works have been to some extent rendered into other languages. The 'Ode to Niagara' is well known. Heredia has been considered by many the greatest of Spanish-American poets. One of the best editions is that of Ponce de Leon, 'Obras Poeticas de Don José Maria de Heredia' (1875).

Heredity, the transmission of parental characteristics to the offspring. The child possesses the mean between the character of each parent, that is, the father and mother share equally in transmitting their peculiarities. Yet it should be borne in mind that no two individuals are exactly alike, and besides the resemblances to the parents, every child differs in certain respects from the parent. We speak of the force of heredity, and this, whatever be its nature, is very wonderful. Thus the Egyptian of to-day inherits the features and mental characteristics of his ancestors who lived 10,000 years ago. One cause of this is the fact that the physical features and climate of Egypt have remained unchanged for that period. Did heredity act rigidly we should have no modification of type from one geological age to another. The inheritance of one set of characters may, owing probably to profound changes in the environment, lapse, and the original peculiarities be replaced by others. Thus civilized man has thrown off certain habits and tendencies of his savage ancestors, and acquired new and higher culture—modes of action and feeling. Heredity has its limits, and in certain highly specialized types of animals has lapsed or ceased to act as at first. Hurst remarks: "Heredity is merely a likeness of effects due to the likeness of the causes producing them."

There are four types or forms of inheritance: (1) Continuous or normal inheritance, that is, where the children resemble the father and mother. (2) Interrupted inheritance, where the offspring resemble the grandparents. (3) Collateral inheritance, where the offspring inherit the qualities of their uncle or aunt. (4) Atavism or reversion, which is inheritance from a remote ancestor. Thus when individuals of two domesticated races are crossed, the offspring may resemble neither parent, but are like the supposed ancestral or wild species. This is called "throwing back" by breeders. Galton speaks of alternative heredity, and illustrates it by the color of the human eye. "If one parent," he says, "has a light eye-color and the other a dark eye-color, some of the children will, as a rule, be light and the rest dark, they will seldom be medium eye-colored, like the children of medium eye-colored parents." What is called particulate inheritance is common in the color of the hair of horses, dogs, mice, and other mammals, and in the hairs on the leaves of certain plants.

Galton's Law.—We do not know why certain characters are transmitted and others are not, and we cannot foretell, says Bateson, which individual parent will transmit characters to the offspring, and which will not, yet this problem may at some time become solved. From his studies on human stature, and on the transmission of colors in Bassett hounds, Galton has shown that the expectation of inheritance is such that a simple arithmetical rule is approximately followed. He deduced the rule that of the whole heritage of the offspring the two parents together on an average contribute one half, the four grandparents one quarter, the eight great-grandparents one eighth, and so on, the remainder being contributed by the more remote ancestors.

This rule does not in many cases apply, and Galton points out that it takes no account of individual prepotencies. Moreover, says Bateson, there are numerous cases in which on crossing two varieties the character of one variety almost always appears in each member of the first cross-bred generation. For example, the offspring of the polled Angus cow and the short-horn bull is almost always polled or with very small loose "scurs." Seedlings raised by crossing *Atropa belladonna* with the yellow-fruited variety have without exception the blackish-purple fruits of the type. These are now recognized as instances of Mendel's principle of dominance.

Mendel's Law.—As far back as 1865 an Austrian monk, Mendel, made prolonged experiments in crossing varieties of the pea (*Pisum sativum*). His paper was overlooked until attention to his remarkable results was called by De Vries in 1900; he and also Correns and Tschermak at the same time independently rediscovered Mendel's law. Mendel selected seven pairs of characters, such as the shape of the ripe seed, of the cotyledons, of the seed-pod, color of the seed-skin, length of stem, etc. Large numbers of crosses were made between peas differing in respect of one of each of these pairs of characters. It was found, says Bateson, that in each case the offspring of the cross exhibited the character of one of the parents in almost undiminished intensity, and intermediates which could not be at once referred to one or other of the parental forms were not found. "In the case of each pair of characters there is thus one which in the first cross prevails to the exclusion of the other." This prevailing character Mendel called the dominant character, and to the other he gave the name of recessive character.

This law of dominance has been found by Bateson and by Castle to apply to animals as well as plants, and thus is a most important biological law. Thus when mating occurs between two organisms, whether vegetable or animal, differing in some character, the offspring frequently all exhibit the character of one parent only, in which case that character is said to be "dominant." For example, on crossing white mice with gray mice, Castle found that the offspring are gray, that color-character being dominant. The character which is not seen in the immediate offspring is called recessive, for though unseen it is still present in the young, white in the experiment being the recessive color.

The law of dominance has its exceptions; the hybrid often possesses a character of its

own, instead of the pure character of one parent, as is true in cases of complete dominance. The hybrid form often resembles a supposed ancestral condition, when it is usually regarded as a reversion. Examples are the gray hybrid mice, which are indistinguishable in appearance from the house mouse; also slate-colored pigeons resulting from crossing white with buff pigeons.

One result of Mendel's discovery is the purity of the germ-cells. As stated by Castle: "The hybrid, whatever its own character, produces ripe germ-cells which bear only the pure character of one parent or the other." To breeders Mendel's law is of great importance because, as remarked by Castle, it reduces to an exact science the art of breeding in the case most carefully studied by him, that of entire dominance. "No animal or plant is 'pure' simply because it is descended from a long line of ancestors possessing a desired combination of characters, but any animal is pure if it produces gametes (germ-cells) of only one sort, even though its grandparents may among themselves have possessed opposite characters."

The bearings of Mendel's discovery, confirmed by De Vries' experiments, on the origin of species is of great interest and moment. The problem is whether aberrations, sports, or discontinuous variations may not sometimes result in the formation of new species and types, or whether species are all the result of slow, continuous variations. As stated by Castle, "A sport having once arisen affecting some one character of a species, may by crossing with the parent form be the cause of no end of disintegration on the part of any or all of the characters of the species, and the disintegrated characters may, indeed must, form a great variety of new combinations of characters, some of which will prove stable and self-perpetuating."

Mendel's discoveries also explain the principle that new types of organisms are extremely variable, whereas old types are subject to little variation. A new type which has arisen as a sport will cross with the parent form. The offspring, says Castle, will then inherit some dominant character, others latent, and this will result in polymorphism of the race. Thus the suggestion of Galton that species may arise from sports is confirmed, while added cases are afforded by the recent remarkable experiments of De Vries, resulting in the origination of seven new species of primrose by sudden variations, or what he calls "mutations."

Homochronous Heredity.—This is a form of heredity called by Darwin "inheritance at corresponding periods of life." It is exemplified in animals with a metamorphosis, whose larvæ lead a different life and differ greatly in structure and form from the parent. Thus the butterfly inherits in its infancy the caterpillar stage, then the pupa, finally the features of the imago; one character or set of characters appear by heredity, are cast aside, and new features arise, those of the pupa stage, and so on. Each butterfly, beetle, or bee, as well as the fluke-worms, tapeworms, etc., inherit at different periods of their lives stages which have become fixed by homochronous heredity.

The Physical Basis of Heredity.—A number of biologists from Spencer to Jaeger and Weismann have supposed that heredity is due to the transmission from parent to offspring of parti-

cles developed in the reproductive cells of the parent, whence arose the theory now generally held that the nucleus of the spermatozoon and of the egg is the bearer of heredity. Even in the protozoa, if one be divided into nucleate and enucleate halves, the portion without a nucleus degenerates, while the part containing the nucleus lives and regenerates the lost parts. The nucleus contains a portion which stains readily with reagents, and is called the "chromatin," which consists of particles called "chromosomes." Now the nucleus of the egg and that of the spermatozoon contain the same number and quantity of chromosomes, to what are called the cleavage-spindles, hence the chromatin, that is, the chromosomes, are regarded as the bearers of heredity, some of these passing down from one generation to another.

Consult: Weismann, 'The Germ-Plasm' (New York 1893); Bateson, 'Mendel's Principles of Heredity' (Cambridge, England, 1902); Castle, 'Mendel's Law of Heredity' (Cambridge, Mass., 1903); with the earlier works of Darwin, Brooks, Galton, Hertwig, and others.

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Hereford, hēr'ē-fōrd, England, a city and parliamentary borough, capital of Herefordshire on the Wye, 120 miles northwest of London. The chief building is the cathedral, built in 1012-56, rebuilt in 1072, and restored in 1863. It is of early Norman architecture, 335 feet long and 174 feet wide, contains many fine monuments, some as ancient as the cathedral, and its accessory features include a lady chapel, charterhouse, cloisters, an episcopal palace and a library containing valuable MSS., Wyclif's Bible, and a 13th century map of the world. A musical festival of the united choirs of Gloucester, Worcester, and Hereford is given in the cathedral triennially. The see dates from 673; the city was incorporated in the reign of King John. Pop. about 22,000.

Her'esy (Gr. *hæresis*) primitively means a choice or election, and in its application to religious belief is used to designate as well the act of choosing for one's self, and maintaining opinions contrary to the authorized teaching, as also the heterodox opinions thus adopted. In the Acts of the Apostles the word seems to be used of a sect or party, apart from the consideration of its character, whether good or bad; but in the Epistles and in the early Christian writers it is almost invariably used in a bad sense, which is the sense uniformly accepted in all subsequent theological literature.

Even in the apostolic times heresies had arisen in the Church, and before the Council of Nice the catalogue of sects had already swelled to considerable dimensions.

From the very date of the establishment of Christianity in the Roman empire heresy appears to have been regarded as a crime cognizable by the civil law; and Constantine enacted several severe laws for its repression, which were continued and extended by his successors, and were collected into a single title, 'De Hæreticis,' in the Justinian code. The penalties of heresy ordained by these enactments are very severe, extending to corporal punishment, and even to death; and they all proceed on the distinct assumption that a crime against religion

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is a crime against the state. These enactments of the Roman law were embodied in the various codes of the European kingdoms; in English law heresy consisted in holding opinions contrary to the faith of Holy Church. By common law the offender was to be tried in the provincial synod by the archbishop and his council, and, after conviction, was to be given up to the king to be dealt with at his pleasure. But the statute 2 Hen. IV. chap. 15 (*De heretico comburendo*) empowered the diocesan to take cognizance of heresy, and, on conviction, to hand over the criminal directly, and without waiting for the king's writ, to the sheriff or other competent officer. This statute continued practically in force, with certain modifications, till the 29 Charles II. chap. 9, since which time heresy is left entirely to the control of ecclesiastical legislation.

The doctrines considered heretical by the Christian Church may be found in the 'Dictionnaire des Heresies,' by the Abbé Pluquet, with the history, progress, nature, and also the refutations of their errors.

Her'etic, in ecclesiastical terminology, one who embraces a heresy. It is evident that the word heretic can have only the relative meaning of heterodox. The early Christian Church always made a distinction between heretics who obstinately persisted in their heresy, and heretics merely through error, or who had been born in heresy. The fathers of the Church declare themselves ignorant of the final condition of the latter. Again, peaceable heretics are distinguished from those whose doctrines produce public confusion and disorder. However, the general view is that all heresies lead, sooner or later, to disturbances and bloodshed.

Hereward, hēr'ē-ward, a Saxon yeoman who flourished about 1070. He was practically the last to withstand the Normans, holding the Isle of Ely against William the Conqueror 1070-1. After William had succeeded in reaching the refuge of the Saxon patriots, Hereward, scorning to yield, fled to the fastness of the swampy fens to the northward. He was commonly styled HERWARD the WAKE, and his character and adventures form the theme of Charles Kingsley's popular historical romance, 'Hereward.'

Her'ford, Oliver, American humorous author and illustrator: b. England. He is at present on the staff of the 'Criterion.' Among his works are: 'Artful Antics'; 'The Bashful Earthquake and Other Fables and Verses' (1898); 'Alphabet of Celebrities' (1899); 'A Child's Primer of Natural History' (1899); 'Wagner for Infants' (1899); 'Overheard in a Garden' (1900).

Hering, Ewald, German psychologist: b. Altgersdorf, Saxony, 5 Aug. 1834. He studied medicine, and settled at Leipzig as physician in 1860; in 1862 he was lecturer in physiology at the Leipzig University, and in 1865 was professor of physiology and medico-physics in a medical school at Vienna, and in 1870 held the same chair at Prague. Hering is best known for his work in the field of psychophysics, especially for his investigations of visual space perception and for the color theory which he originated. This theory is opposed to the empiristic theory of Helmholtz and is most generally ac-

cepted by psychologists at the present time. His writings include: 'Die Lehre vom Binocularen Sehen' (1860); 'Zur Lehre vom Lichtsinn' (1872-4); 'Der Raumsinn und die Bewegung des Auges'; 'Das Gedächtniss als eine allgemeine Funktion der organisierten Materie' (1870).

Her'ing, Rudolph, American hydraulic and sanitary engineer: b. Philadelphia, Pa., 26 Feb. 1847. He was graduated at the Dresden (Germany) Polytechnic School, 1867, and became assistant engineer of Prospect Park, Brooklyn, N. Y., the following year. He was assistant engineer of Fairmount Park, at Philadelphia, 1869-71, and astronomer at Yellowstone National Park in 1872. After serving as assistant city engineer 1873-80 he opened an office for private practice in engineering and has furnished designs for sewerage and water supply for numerous towns and cities in the United States, Canada and South America. He is member of many professional societies both in Europe and America, and has written many published reports on sewerage and water supply of cities.

Heriot, hēr'y-ôt, George, Scottish philanthropist: b. Edinburgh 1563; d. London 12 Feb. 1624. His father was a goldsmith in Edinburgh, and the son followed his father's profession, and was admitted a member of the Incorporation of Goldsmiths in May 1588. In 1597 he was appointed goldsmith to the queen by a charter from James VI., and on the accession of the latter to the English crown followed the court to England. From the period of Heriot's settlement in London little is known of his history. He died on 12 Feb. 1624, and was buried at St. Martin's-in-the-Fields. By his will he left nearly the whole of his fortune toward the founding and erecting of a school for poor boys in Edinburgh, styled in the bequest a "hospital." The foundation of the present structure, known as Heriot's Hospital, was laid in July 1628; and the expense of the erection exceeded £30,000 sterling. From the rise in value of property the yearly revenue of the hospital has very greatly increased; and the governors were empowered in the reign of William IV. to establish elementary schools within the city for the gratuitous education of poor children, 16 day schools being ultimately established, besides evening schools. In 1885, however, an entirely new scheme was introduced and a great part of the funds are now devoted to the support of Heriot's Hospital School and the Heriot-Watt College. The former is a day school for boys of 10 and upward, and the Heriot-Watt College is a college giving a thorough technical, commercial, and literary education chiefly by evening classes, though there are also day classes. The annual revenue is now about \$150,000.

Her'kimer, Nicholas, American military officer: b. about 1715; d. Danube, N. Y., 17 Aug. 1777. He became a lieutenant of militia, served in the French and Indian war, and defended Fort Herkimer in 1758. Promoted brigadier-general of militia in 1776, he directed operations against Sir John Johnson, and when Fort Stanwix was threatened by a combined force of Indians, Tories, and regulars, advanced to its relief. He was ambushed by Col. Saint Leger at Oriskany, and one of the most closely-fought battles of the Revolutionary War followed.

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Herkimer having lost a third of his force, was unable to continue, and Saint Leger's army was rendered thoroughly ineffective. Herkimer himself was wounded, and died as the result of an unskilful operation. The town and county of Herkimer, N. Y., were named in his honor.

Herkimer, N. Y., village, county-seat of Herkimer County; on the Mohawk River, the Erie Canal, and on the New York C. & H. R. railroad; about 25 miles east of Utica and 68 miles northwest of Albany. The chief manufactures are flour, furniture, mattresses, knit goods, beds, paper, creamery products, and cigars. The city owns and operates the electric plant and the waterworks. It is the seat of Folts Mission Institute. Pop. (1910) 7,520.

Her'komer, Hubert, English painter; b. Waal, Bavaria, 26 May 1849. His father, a wood carver, went to America in 1851, but returned to Europe and settled in Southampton in 1857. Hubert studied at the School of Art in that city, where he assisted in founding a life school for drawing. In 1867 he exhibited in the Dudley Gallery. From this time he gradually gained recognition as a painter in water colors, and in 1871 was elected a member of the Institute of Water Color Painters. His first picture exhibited at the Royal Academy, 'After the Toil of the Day' (1873), a German subject, attracted attention; and two years later he gained a great reputation by his famous picture representing 'The Last Muster—Sunday at the Royal Hospital, Chelsea,' to which a grand medal of honor was awarded at Paris in 1878. Later pictures are: 'Eventide: a Scene in Westminster Union' (1878), "a worthy companion of the other realistic yet more heroic study of old age, which the artist made in his Chelsea Pensioners"; 'Missing: a Scene at the Portsmouth Dockyard Gates' (1881), "a masterpiece in its way"; 'On Strike' (1891), his diploma work; 'Back to Life: a District Nurse Taking out a Child for the First Walk after a Long Illness' (1896); and 'The Guards' Cheer' (1898), representing a scene in the Diamond Jubilee procession. Among many portraits painted by him the best known are those of Wagner, Ruskin, and Tennyson. His best water-color pictures are: 'Im Walde'; 'The Woodcutter's Rest'; 'The Poacher's Fate'; and 'At the Well.' Mr. Herkomer was elected associate of the Royal Academy in 1879, and full member in 1890, and from 1885 till 1895 held the Slade professorship of fine art at Oxford in succession to Mr. Ruskin. He holds a life professorship at Munich, superintends an art school founded by himself at Bushey in Hertfordshire, and for the theatre connected with it has written several plays. Herkomer also occupies a high place as an etcher and mezzotint engraver. He has published: 'Lectures on Etching and Mezzotint Engraving' (1892). See Courtney, 'Life' (1892).

Hermadad, ĕr-mān-dāth', a confederation of the cities of Aragon, formed to defend themselves against the usurpations and the rapacity of the feudal nobility. This object was most clearly apparent in the brotherhood (Hermadad) formed about the middle of the 13th century in Aragon, and that formed about 1282 in Castile. In 1295, 35 cities of Castile and Leon formed a joint confederacy for the same object. These fraternities were the model of the

later Hermandad of the municipal communities, which was formed in Castile under the reign of Ferdinand and Isabella. It was established in 1486 with the approbation of the king. The city authorities raised a military force, and appointed judges in different parts of the kingdom. Neither rank nor station protected the offender against the tranquillity of the country, nor could he find safety even in the churches. The Santa Hermandad (holy brotherhood) which readers of Don Quixote will be acquainted with, had, like the earlier institution, of which it was a continuation, the object of securing internal safety, and seizing disturbers of the peace and highway robbers, but did not act except in case of offenses actually committed. It consisted of a company of armed police officers, who were distributed in the different provinces of the kingdom of Castile, and whose duty it was to provide for the security of the roads outside of the cities. One of their strictest regulations was not to use their power within the cities. They were subject to the Council of Castile. The principal divisions of the company had stations at Toledo, at Ciudad Rodrigo, and at Talavera.

Hermann, ĥēr'mān, Alexander, American conjurer; b. Paris, France, 10 Feb. 1844; d. near Great Valley, N. Y., 17 Dec. 1896. From his brother Carl, Alexander took his earliest lessons in sleight-of-hand and the brothers then traveled in Europe and became widely known as skilled conjurers. Coming to the United States in 1867 they met with great success. The elder presently returned to Europe, but Alexander became a citizen of the United States, made a tour of the world and had few equals in his profession.

Hermann (ĥēr'mān) und Dorothea, dör-ō-tā'a, a pastoral poem by Goethe, published in 1797. It contains about 2,000 hexameter lines. The scene is the broad Rhine plain, and the time the poet's own. The standard English translation is that by Miss Ellen Frothingham (1870).

Hermann, Mo., a town in Roark Township, the capital of Gasconade County, on the south bank of the Missouri River, here crossed by a bridge, 81 miles west of St. Louis, and on the Missouri Pacific railroad. It is in a grape-vine-growing region and manufactures wine, beer, flour, tools and cigars. Pop. 1,700.

Hermannstadt, or Nagy-Szeben, Austria, the capital of a county in Transylvania. See SZESEN, NAGY.

Hermaph'roditism, the occurrence of both kinds of sexual glands in one and the same animal. The differentiation of the sexes begins with the polyps, when for the first time in the animal kingdom we meet with individuals which are male and female. The lower plants and in the animal kingdom the sponges and Hydra (q.v.) are monœcious, that is, sexual cells occur in the same individual. In the more highly specialized animals, the sexual glands exist in different individuals, and the form is said to be bisexual, or dioecious, as opposed to hermaphroditic forms.

True or Natural Hermaphroditism.—This is found in many flowering plants, in sponges, most coelenterates, many worms, including the earthworm, many mollusks, and in most barna-

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cles, and this appears to be in relation with their more or less fixed mode of life. As a rule testes and ovaries occur in the same animal, but situated in different regions of the body, while in land snails there is a hermaphroditic gland which produces spermatozoa and eggs in the same follicle. Certain animals, or frogs, which are bisexual as adults, pass through an embryonic hermaphroditism. Normal hermaphroditism is very rare in insects and vertebrates; in the latter only two cases are known, that is, a sea-perch (*Serranus scriba*) and the hagfish (*Myxine*).

Abnormal Hermaphroditism.—What in man is called hermaphroditism is a misnomer, as it arises from malformation of the external reproductive organs. In insects occurs lateral hermaphroditism in which one half of the moth or butterfly, for example, is male and the other female. In some of these cases dissection has shown that only male or female sexual glands alone occur in an undeveloped condition. This is called *gynandromorphism*. Abnormal hermaphroditism sometimes occurs in fishes and batrachians where an ovary is found on one side and a testis on the other. It is curious that in a threadworm (*Angiostomum*) and in certain isopod crustacea (*Cymothoidæ*) the reproductive glands are first male, the same gland afterward producing eggs.

Hermes, Georg, gā-ōrg' hēr'mēs, German theologian: b. Dreyerwalde, Westphalia, 22 April 1775; d. Bonn 26 May 1831. He studied theology at the University of Münster, became a teacher in the gymnasium of that city, and in 1807 professor of dogmatic theology in the university. When the Prussian government established the University of Bonn, Hermes was appointed to the chair of Catholic theology (1819). Here he began to distinguish himself by his attempts to found a speculative, philosophic, and dogmatic school in the church itself, delivering a series of lectures which caused great sensation by aiming at an alliance between Protestants and Catholics. This attempt to base the positive theology of the church (a doctrine known as *Hermesianism*) drew around him great numbers of followers. Many of these in time filled chairs of theology and set forth their views in conjunction with their master in a magazine, the 'Zeitschrift für Philosophie und katholische Theologie,' published at Cologne from 1832. The method which Hermes advocated insisted that the truth of revelation and of the Catholic Church should first be tested by reason, and that revelation should then be followed. He did not go so far as to declare that all the dogmas in themselves could be proved *a priori*, but endeavored to found the right of the church to teach them on the ground of reason. *Hermesianism* was in fact an ingenious effort to base the doctrines of the church on Kant's system of philosophy. It aroused powerful opposition, being condemned as heretical by a papal letter of 26 Sept. 1835. Hermes' scholars stoutly defended their orthodoxy, many of them repeatedly appealing to the pope, but without success.

Hermes, hēr'mēs (called by the Romans *Mercurius*, and identified with their own god of that name), in Greek mythology the son of Zeus and Maia. According to legend his birthplace was in the mountains of Cyllene, Arcadia. Four hours after his birth he invented

the lyre, which he made by killing a tortoise, and stringing the shell with three or seven strings. He then sang to it the loves of Zeus and his mother Maia. Having concealed the lyre in his cradle, he was seized with hunger, went in the dark evening to Pieria, and stole 50 oxen from the sacred herd of Apollo which he drove backward and forward to confound their tracks; then walking backward himself, he drove them backward also; and after having killed two of them near the river Alpheus roasted and sacrificed a part to the gods. He concealed the remainder in a cavern. He also carefully destroyed all traces of them. The next morning Apollo missed his oxen, and went in search of them, but he could discover no traces of them until an old man of Pylos told him that he had seen a boy driving a herd of oxen in a very strange manner. Apollo now discovered that Hermes was the thief. He hastened to Maia, and accused the infant, who pretended to be asleep, and, not terrified by the threat of the god that he would hurl him into Tartarus, steadily maintained his innocence. Apollo, not deceived by the crafty child, carried his complaint to Zeus. Hermes lied even to him. But Zeus perceived him to be the offender; but was not angry with him, and smiling at his cunning, ordered him to show the place where the oxen were concealed. To secure him Apollo bound his hands, but his chains fell off, and the cattle appeared bound together by twos. Hermes then began to play upon his newly-invented lyre, at which Apollo begged the instrument of the inventor, learned of him how to play on it, and gave him a whip to drive the herd, thenceforth belonging to both in common.

They then concluded a contract with each other: Hermes promised never to steal Apollo's lyre or bow; the latter gave him the *caduceus*. The ancients represent Hermes as the herald and messenger of the gods. He conducts the souls of the departed to the lower world, and is therefore the herald of Pluto, and the executor of his commands. His magic wand had the power to close the eyes of mortals, to cause dreams, and wake the slumbering. The qualities requisite for a herald he possessed in the highest perfection, and bestowed them on others—grace, dignity, and insinuating manners. He was also the symbol of prudence, cunning, and fraud, and even of perjury, and was the god of theft and robbery. In the wars of the giants he wore the helmet of Pluto, which rendered him invisible, and slew Hippolytus. When Typhon compelled the gods to fly before him and conceal themselves in Egypt, he metamorphosed himself into an ibis. He is also mentioned by Homer as the patron of eloquence, and still more particularly by Hesiod. Of his inventions Homer makes no mention. Later writers ascribe to him the invention of dice, music, geometry, the interpretation of dreams, measures and weights, the arts of the palestra, letters, etc. He was also regarded as the patron of public treaties, as the guardian of roads, and as the protector of travelers. He was represented in art as a boy in the prime of youth, sometimes with the *caduceus*, and sometimes with a winged cap, standing, sitting, or walking. The artists of later times placed him among the youthful and beardless gods. The most prominent traits of his character are vigor and dexterity. In the

HERMES TRISMEGISTUS — HERMITE

representation of Hermes of a later date the relations of corporeal beauty and mental dexterity are wonderfully preserved. Artists made the cock his symbol, on account of its vigilance or love of fighting (in allusion to gymnastics); the tortoise, on account of his invention of the lyre; the purse, because he was the god of traffic; a ram and a goblet, because he was the director of religious ceremonies and sacrifices; the trunk of a palm-tree, upon which his statues lean, because he was the inventor of arithmetic and writing (upon palm-leaves); the *harpe* or sickle-shaped knife, because he was the slayer of Argus.

Hermes Trismegistus, tris-mē-jīs'tūs, the Greek title of the Egyptian moon god, Thoth, one of the most interesting figures in Egyptian mythology. He is represented as Ibis or with the ibis head, and is fully illustrated in the monuments and papyrus rolls from time to time brought to light. He is the god of time and of its divisions; he is the measurer and the god of measurements. He is the conductor of the dead. He is also the god of human intelligence, to whom are attributed all the productions of human art. All the literature of Egypt is attributed to him—all the writings that relate to the different sciences, mathematics, astronomy, medicine, music. These were called by the Greeks the *Hermetic Books*. Thoth is also credited with the invention of alchemy and magic. The *Hermetic art* is used to mean alchemy. The secrets of this art were handed on from teacher to pupil orally and in secret and this transmission was termed the *Hermetic chain*. For these reasons the Greeks identified him with their *Hermes*, and besides called him *Trismegistus*, "thrice great." By later writers, Euhemerists, Neoplatonists (q.v.), and Christians, Thoth was considered a great Egyptian king, a teacher of mankind, who had left books of magic and mystery behind him. Numerous books of such a sort once existed in Egypt. Clement of Alexandria knew of 42, and so-called *Hermetic fragments* are still extant, in the works of Stobæus, Cyrillus, Suidas and Lactantius. The *Hermetic books* as we know them belong probably to no earlier date than the 3d or 4th century of our era, and are in Greek and Latin.

Hermit (Gr. *eremītēs*), a solitary ascetic, who, with a view to more complete freedom from the cares, temptations, and business of the world, took up his abode in a natural cavern or a rudely formed hut in a desert, forest, mountain, or other solitary place. Hermits began to appear in the Christian church in the 3d century. The advocates of asceticism (q.v.) were the first to set the example of retiring from cities to rural districts and villages. But the hermits sought to withdraw altogether from mankind, that they might give themselves up to holy contemplation. The earliest hermit is said to have been Paul of the Thebaid (Egypt), who during the Decian persecution fled to the desert (250); there he lived for the rest of his life, dying, 113 years old, about 342. The fame of his sanctity quickly incited others to imitate his mode of life. The most famous amongst these successors was St. Anthony (q.v.). At the time of his death (365) hermit cells existed in considerable numbers in the deserts of Egypt, Syria, and Palestine. The fame of their sanctity drew many to visit these hermits partly out

of curiosity, to get religious advice from them, partly also in the belief that diseases were cured by their blessing. Sometimes they returned for a short time to the midst of their fellow-men to deliver warnings, instruction, or encouragement, and were received as if they had been inspired prophets or angels from heaven. But the number of hermits gradually diminished as the cenobite life of convents grew into fashion. Indeed the institution at no time secured the same footing in the Western Church that it did in the Eastern; and perhaps the reason may in part be found in the difference of climate, which renders a manner of life impossible in most parts of Europe that could be pursued for many years in Egypt or Syria. Partial revivals of the practice continued to be made, however, during some centuries, St. Cuthbert (q.v.) being a case in point. See *MONACHISM*, and Charles Kingsley's 'Hermits' (1869).

Hermit-crabs, crabs that shelter themselves in spiral sea-shells, for the protection of the soft-skinned and unsymmetrical abdomen. They are members of the *Macrura* (see *DECAPODA*), and have very large and generally unequal claws, one being used to close the entrance of the shell into which the hermit can wholly retract himself. The abdominal appendages are practically aborted, with the exception of those at the tip of the tail, which hold firmly to the spire of the inhabited shell. The hermit-crabs belong to three families, namely: *Paguridae*, or common marine hermit-crabs; *Parapaguridae*, or deep-sea hermit-crabs; and *Cenobitidae*, or terrestrial hermit-crabs. Two species are numerous on the American Atlantic coast running actively about in rock pools and shallows. The little hermit-crab (*Eupagurus longicarpus*) generally inhabits the shells of dog-whelks (*Ilyanassa*), while the larger species (*E. pollicaris*) occupies those of *Lunatia* or sometimes of the winkles and conchs. As they grow they must move to larger and larger shells, and the search for new tenements and dangerous change of abodes in the presence of enemies makes the life of one of these animals more than ordinarily exciting. The habits of these and other hermit-crabs are of great interest, generally, and especially on account of the various hydroids, anemones and mollusca which associate with them as commensals. The palm or robber-crab (q.v.) of the East Indies, and the land-crabs of the West Indies, are good examples of terrestrial hermit-crabs. Consult J. R. Henderson, 'Challenger Report on Anomura'; Verrill, 'Invertebrates of Vineyard Sound' (1875); Arnold, 'Sea Beach at Ebb-tide' (1901). See *COMMENSALISM*, *CRAB*, *CRUSTACEA*.

Hermit Thrush. See *THRUSH*.

Hermitage, The, Andrew Jackson's home at Nashville, Tenn., from about 1804, when he removed there from Hunter's Hill. In 1819 the house was built in which he lived till his death in 1845. The Hermitage is now the property of the State of Tennessee.

Hermite, Charles, shārl ār-mēt, French mathematician: b. Dieuze, Meurthe, German Lorraine, 24 Dec. 1822; d. Paris 14 Jan. 1901. He entered the *Ecole Polytechnique* in 1842, but left it to devote his attention wholly to mathematics. From 1876 to his death he held the chair of higher algebra in the University of

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Paris. His principal claim to be considered a great and original mathematician rests on his investigations in the line of functions, and his first important work on this theory won for him election to the Academy of Sciences. He proceeded to make discoveries in the theory of algebraic forms and in the theory of numbers. He finally settled the question of the solubility of the quintic equation, and really led the way to Lindemann's further investigations. For a list of his writings see 'Catalogue of Scientific Papers of the Royal Society of London,' Vols. III. and VII.

Hermosillo, hār-mō-sēl'yō, Mexico, capital of the state of Sonora, on the river Sonora, about 60 miles from the Gulf of California, and 78 by rail north from the port of Guaymas, with which it has a large traffic, being the principal entrepôt for the trade with the interior. Large quantities of fruit are grown in the vicinity, especially grapes, from which much brandy is made.

Hern'don, William Henry, American lawyer: b. Greensburg, Ky., 28 Dec. 1818; d. near Springfield, Ill., 18 March 1891. He studied at Illinois College, was admitted to the bar in 1844, and in the same year formed a law partnership with Abraham Lincoln, which continued formally till the latter's death. He was mayor of Springfield, Ill., in 1855. With J. W. Weik, he wrote the well-known 'Herndon's Lincoln: The True Story of a Great Life' (in a new ed. 1891), which is particularly valuable for the study of Lincoln's personality and the details of his early career.

Herne, James A. (JAMES AHERNE), American actor and playwright: b. Troy, N. Y., 1 Feb. 1840; d. New York 2 June 1901. He first appeared in a traveling company, and later in various roles and organizations throughout the United States. Later he was actor-manager at San Francisco, and in 1878 presented his first play, 'Hearts of Oak,' which won immediate success. 'Drifting Apart' (1885), 'The Minute-Men' (1886) and 'Margaret Fleming' (1890) were less favorably received, although the last was highly ranked by the critics. In 1883-4 Herne wrote his most successful work, 'Shore Acres,' which was first performed as 'The Hawthornes' at Chicago in 1892, and in 1892-3 in Boston under its present title. He himself appeared as 'Uncle Nat' Berry. 'Shore Acres' was followed by 'The Rev. Griffith Davenport' (1899), a dramatization of Helen Gardner's 'An Unofficial Patriot,' and 'Sag Harbor' (1900). As both actor and dramatist Herne was a skilful delineator of types of everyday life.

Hernia (Latin, a rupture, a burst, a descent), a swelling formed by the displacement of a soft part, which protrudes by a natural or accidental opening from the cavity in which it is contained. The three great cavities of the body are subject to these displacements. The brain, the heart, the lungs, and most of the abdominal viscera may become totally or partially displaced, and thus give rise to the formation of hernial swellings. Displacements of the brain and of the organs of the chest are, however, extremely rare, and are in general the result or symptom of some accident or disease. Many parts of the abdominal wall may become the

seat of hernias, but they most commonly appear in the front lower regions, which, being destitute in great measure of muscular fibres, and being the site of many of the openings leading from the abdomen to the limbs, offer less resistance to the displacement of the viscera. Hernias are most common in the groin, at the navel, more rarely in the vagina, at the interior and upper part of the thigh, and at its lower and posterior part. They have received different names from their positions. All the abdominal viscera, with the exception of the duodenum, the pancreas, and the kidneys, may form a hernia, but they are not all displaced with the same facility. The omentum and intestinal canal escape easily; the stomach, liver, and spleen rarely form hernias. Most of the viscera, when displaced, push the peritoneum forward before them; this membrane thus forms a covering to the hernia, which is called the hernial sac. If the hernia, with its sac, can be entirely replaced, it is said to be reducible; if, from its size or other cause, it cannot be restored to its former place, it is irreducible.

Among the predisposing causes of hernia may be ranked any circumstance which diminishes the resistance of the abdominal walls, whether natural or accidental; such as muscular weakening of those walls by a forced distention, as in pregnancy, by accidents, by lifting heavy weights, or by excessive standing. Any prolongation of the viscera which tends to bring them in contact with points at which they may protrude, and articles of dress which push the organs toward the weaker parts of the abdominal wall (as corsets), may also produce hernia. The efficient causes of hernia are all circumstances which may break the equilibrium existing between the abdominal walls and the viscera, which react and mutually press upon each other. The simultaneous contraction of the abdominal muscles and of the diaphragm, which takes place on every violent effort, is one of the chief of these cases. Hence sneezing, coughing, leaping, playing on wind-instruments, etc., may be the direct cause of a hernia.

The symptoms of a hernia are the existence of a tumor or swelling at any point of the abdomen, but more particularly in the region of the groin. A reducible hernia is not a very troublesome disease, but may become so by acquiring an increase of size, and by strangulation. A hernia is said to be strangulated when it is not only irreducible, but also subjected to a continual constriction; this constriction may be produced by different causes, but it is generally a constriction at the opening through which the hernia protrudes. As soon as a patient perceives that he is affected with a hernia he should have recourse to medical advice, for the disease is then in its most favorable state for treatment. The hernia is immediately reduced, and must then be subjected to a constant compression. This is done by means of a truss (q.v.). An irreducible hernia must be supported with great care. All violent exercises and excess in diet must be avoided. Strangulated hernia, presenting greater danger, requires more prompt relief. The object of treatment is to relieve the constriction. If the reduction cannot be effected by other means, an operation will be necessary. This consists in dividing the parts which produce the constriction. The longer this opera-

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tion is delayed, the more dangerous it will become. After the parts are healed, the opening must be subject to compression, as in the case of a simple hernia. Radical operation for hernia is the most advisable form of treatment. It is safe in the hands of a competent surgeon.

Hero, a priestess of Aphrodite at Sestos. The loves of Hero and Leander, a youth of Abydos, on the other side of the Hellespont, are related in a poem by Musæus. No difficulties could discourage Leander. He swam every night across the Hellespont, guided by a torch which shone across the strait from the tower of Hero, and even continued his visits during the winter. On one occasion, however, the guiding light was extinguished, and his strength failed him, and the waves carried his body to the foot of the tower, where Hero anxiously awaited him. Overcome with anguish at the sight, she threw herself from the tower and perished.

Hero of Alexandria (Gr. *Herōn*), Greek mathematician and natural philosopher; fl. perhaps in the 1st century A.D. He seems to have invented a number of machines, among which are "Hero's fountain," and a steam-engine on a principle similar to that of Barker's mill (q.v.). He also made some contributions to pure mathematics. Hultsch edited the remaining fragments of his geometrical works in 1864, and Schmidt began in 1899 an edition of his complete extant writings. See **HERO'S FOUNTAIN**.

Herod, called **THE GREAT**, king of the Jews: b. about 62 B.C.; d. 4 B.C. He reigned from 37 B.C. until his death. He was the second son of Antipater the Idumean, who, being made procurator of Judea by Julius Cæsar, appointed him to the government of Galilee. He at first embraced the party of Brutus and Cassius, but after their death reconciled himself to Antony, by whose interest he was first named tetrarch, and afterward king of Judea. After the battle of Actium Augustus confirmed him in his kingdom. As a politician and commander, his abilities were conspicuous. He rebuilt the temple at Jerusalem with great magnificence, and erected a stately theatre and amphitheatre in that city, in which he celebrated games in honor of Augustus, to the great displeasure of the more zealous of the Jews. He also rebuilt Samaria, which he called Sebaste, and adorned it with very sumptuous edifices. He likewise, for his security, constructed many strong fortresses throughout Judea, the principal of which he termed Cæsarea, after the emperor. On his palace, near the temple of Jerusalem, he lavished the most costly materials, and his residence of Herodium, at some distance from the capital, by the beauty of its situation, drew around it the population of a great city. Such, indeed, was his magnificence, that Augustus said his soul was too great for his kingdom. Herod was the first who shook the foundation of the Jewish government, by dissolving the national council, and appointing the high-priests, and removing them at pleasure, without regard to the laws of succession. His policy, ability, and influence with Augustus, however, gave a great temporary splendor to the Jewish nation.

Herod Agrippa I., king of Judea: d. Cæsarea 44 A.D. He reigned from 37 A.D. until his

death. He was son of Aristobulus. At Rome with Drusus, son of Tiberius, on whose death he left Rome for Idumæa; but returned some years after. On the accession of Caligula 37 A.D. he was honored with the title of king, and received the tetrarchies of Philip and Lysanias, and later that of Antipas. Upon the accession of Claudius his rule was extended to include all the dominions of Herod the Great. It was this Herod who, to please the Jews, caused St. James to be put to death, and St. Peter to be imprisoned. His power and opulence acquired him a great reputation, and he really did much for the benefit of the Jews. His death is described in Acts xii. 20-3.

Herod Agrippa II., king of Judea: d. 100 A.D. He reigned from 53 A.D. until his death. He was son of Herod Agrippa I. He resided much at Jerusalem, and here, together with his sister, Berenice, heard the defense of Paul, addressed to the Roman governor Festus (Acts xxv. 13-xxvi. 32). A great builder, he improved his capital city of Cæsarea Philippi; renamed by him Neronias. It was in his reign that the Temple was completed. Being driven from Jerusalem in the revolt which proved so fatal to the Jews, he joined Cestius, the Roman commander, and, when Vespasian was sent into the province, met him with a considerable reinforcement. During the siege of Jerusalem he was very serviceable to Titus.

Herod Antipas, tetrarch of Galilee. He reigned from 4 B.C. to 37 A.D. He was son of Herod the Great. This was the Herod who put to death St. John the Baptist (Mark vi. 14-29), in compliment to his wife Herodias, and it is he who is the familiar 'Herod' of the New Testament narrative. Accused of having been concerned in the conspiracy of Sejanus, and of being in secret league with the king of Parthia, he was stripped of his dominions, and sent (39 A.D.) with his wife into exile at Lugunum (Lyons), or, as some say, to Spain, where he died.

Herodes, Atticus. See **ATTICUS HERODES**.

Hero'dias, a granddaughter of Herod the Great and Mariamne, daughter of Aristobulus and sister of Herod Agrippa I. She was first married to her half-uncle Herod Philip, whom she abandoned to connect herself with his half-brother Herod Antipas. It was by her artifice that Antipas was persuaded to order the death of John the Baptist (Matt. xiv. 3-12; Mark vi. 17-29).

Herod'otus, Greek historian, called the "father of history": b. at Halicarnassus in Asia Minor about 484 B.C. Before writing his history he traveled extensively, visiting the shores of the Hellespont and the Euxine, Scythia, Syria, Palestine, Babylon and Ecbatana, Egypt as far as Elephantine and other parts of northern Africa, everywhere investigating the manners, customs, and religion of the people, the history of the country, productions of the soil, etc. On returning home he found that Lygdamis had usurped the supreme authority in Halicarnassus, and put to death the noblest citizens, and Herodotus was forced to seek an asylum in the island of Samos. Having formed a conspiracy with several exiles he returned to Halicarnassus and drove out the usurper, but the nobles who had acted with him immediately formed an

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aristocracy more oppressive than the government of the banished tyrant, and Herodotus withdrew to the recently founded colony of Thurii, in Italy, where he seems to have spent most of his remaining life. Here, at an advanced age, we are told by Pliny, he wrote his immortal work, a statement strengthened by the fact that events are noticed in the body of the book which occurred so late as 409 B.C., while its abrupt ending proves almost beyond question that he was prevented by death from completing it. The history is divided into nine books, each bearing the name of a Muse, and is written in the Ionic dialect. The object of the historian is to narrate the conflict between the Greeks and Persians, and he traces the enmity of the two races back to mythical times. Passing rapidly over the mythical period he comes to Cræsus, king of Lydia, of whom and of his kingdom he gives a comparatively full history. The conquest of Lydia by Cyrus induces him to relate the rise of the Persian monarchy and the subjugation of Asia Minor and Babylon. The history of Cambyses and his Egyptian expedition leads him to introduce the valuable details of the history, geography, and manners and customs of Egypt, occupying the second book. The Scythian expedition of Darius causes the historian to treat of the Scythians and the north of Europe; and the subsequent extension of the Persian kingdom affords him opportunity for an account of Cyrene and Libya. In the meantime the revolt of the Ionians breaks out, which eventually brings on the conflict between Greece and Persia. An account of this outbreak and of the rise of Athens after the expulsion of the Pisistratidæ, is followed by what properly constitutes the principal part of the work, and the history of the Persian war now runs on in an uninterrupted stream until the taking of Sestos. There are English translations of his history by Macaulay (1890); Beloe, Cary, and Rawlinson, the last with important notes and dissertations. The 'Life of Homer,' attributed to Herodotus, and printed at the end of several editions of his works, is now universally believed to be a production of a later date. The best editions of the history of Herodotus are by Wesseling (1763); Schweighäuser (1806); Bähr (1855-61); Stein (1871).

Heroin, hër'ô-in, C₁₇H₁₇NO₂(CH₃CO)₂, the diacetic ester of morphine. It occurs as a faintly bitter, colorless, odorless, crystalline powder, which is nearly insoluble in water. It is soluble in dilute acids, however, and is precipitated by alkalis. Its hydrochloric dissolves freely in water and in alcohol, but is insoluble in ether. Heroin was first prominently introduced to the medical world in 1898.

Herold, Louis Joseph Ferdinand, loo-ë zhô-zëf fër-dë-nân ä-rôld, French musical composer: b. Paris 28 Jan. 1791; d. Thernes, near Paris, 19 Jan. 1833. A pupil of the Conservatoire, he also studied composition under Catel, Méhul, and Cherubini, and in 1812 won the Prix de Rome with the cantata 'Mlle. de la Vallière.' His first opera, 'La Gioventù di Enrico Quinto' (1815) was received by the Neapolitan public with applause. His first serious début as composer for the French stage was with his comic opera 'Les Rosières' (1817). This very successful work was followed in quick succession by numerous others of varying for-

tune. At last in 1831 appeared his 'Zampa,' and in 1832 his 'Le Pré aux Clercs,' the operas on which his fame chiefly rests, and which have gained a permanent place, the former especially being still produced with acceptance in the principal cities of the Continent. Consult: Jouvin, 'Herold sa Vie et ses Œuvres' (1868).

Her'on, Matilda, American actress: b. Draperstown, near Londonderry, Ireland, 1 Dec. 1830; d. New York 7 March 1877. She was brought to the United States as a child, and appeared on the stage for the first time in Philadelphia as Bianca in 'Fazio.' Her chief parts, in which she met with great success throughout the United States, were Camille in 'La Dame aux Camélias'; and Ulah in 'De Soto.'

Herondas, or **Herodas**, Greek poet, probably flourishing about the latter half of the 3rd century B.C. Little positive information is obtainable concerning the place of his birth, but it was probably in the island of Cos. Prior to 1891 only a few fragments of his verses had been found, but in that year an Egyptian papyrus was found containing several poems (mimes or mimianibi) and these were published by F. G. Kenyon, thus bringing to light a phase of Greek life and times of which the history has been meagre. Seven of the poems are in comparatively complete form, and, besides giving an insight into Heronda's life and work, they picture the every day life of the times in extremely realistic terms, though the satirical portions of them are not personal in their nature. In composition the mimes are in choliambic verse or iambic trimeter and are written in the Ionic dialect. The latest edition containing additions by O. Crusius was published in 1898, entitled 'Untersuchungen zu den Mimiamben des Herondas.' See **MIME**.

Herons, wading birds of the order *Herodii*, forming, with egrets and bitterns, the family *Ardeideæ*. The family is characterized by a thin, compressed body; a long, thin neck; a straight, narrow, pointed beak; fully feathered head; longish, slender legs; three toes in front, the two outer united by a membrane, the middle claw pectinate; large, blunt wings; extensive development of powder-down tracts; and often by elongated feathers of the top of the head and other parts. Upward of 70 species of herons and their immediate allies are known, of which 14 inhabit North America. The bitterns (q.v.), with 10 tail-quills, form the sub-family *Botaurina*, the herons and egrets (q.v.), with 12 tail quills, the *Ardeina*. Egrets are simply white herons. The great blue heron (*Ardea herodias*) to which *A. cinerea* of Europe is closely related, inhabits all parts of North America and northern South America. It is a large bird with a length of about four and a spread of nearly six feet, and of beautiful slate-blue color, with the long flowing plumes black. It is to be found by the side of streams, lakes and the seashore, usually alone. Fish form the bulk of its food, but it also devours frogs, small reptiles, insects, and almost any kind of animal which it can capture. It roams in search of food mostly in the morning and evening. The heronry, or breeding-place, is usually found among high trees, and the same breeding-place is used by successive generations if they are unmolested; frequently several species of herons consort together at a favorite breeding-place. The large

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nest is made of twigs and sticks, and is lined with rushes, grass, and various similar materials. The eggs, usually three or four in a nest, are of a fairly uniform greenish blue color. Many nests are usually found in one heronry, and sometimes the nests are built on the ground or on a cliff. The cry is a sort of "crank, crank," uttered in a hoarse voice. In the North the blue heron is migratory, elsewhere it is resident. The little blue heron (*A. carulea*) is found in the eastern United States from the Middle States southward and in the West Indies and Central America. It is scarcely more than one half the size of *A. herodias* and exists in two color phases, the one dark slate-blue with purplish reflections on the head and neck, the other white with traces of blue, especially constant on the unfeathered parts. This species formerly bred with other southern species in great heronries, most of which have been decimated by plume-hunters.

The little green heron or fly-up-the-creek (*Butorides virescens*) ranges throughout temperate North America and somewhat beyond southward, breeding nearly everywhere. Northward it is migratory and is the familiar heron about the streams and ponds of the Middle and New England States, where it usually nests in pairs or small communities and mostly in thick bushes or cedar trees; in other localities it sometimes breeds with larger species in heronries. The pale greenish elliptical eggs are from three to six in number. Its foods consist chiefly of small frogs, minnows and snakes, for which it searches by day as well as by night along the shallows of streams, where its harsh cry of alarm is often the first intimation of its presence. The name refers to the beautiful deep bronze green color of the upper parts.

The night-herons (*Nycticorax naevius*, and *N. violaceus*), which are closely related to the *N. grisea* of Europe, are easily distinguished from other herons by the thick, stout beak. The former, known as the black-crowned night-heron or squawk, is common throughout the United States and Canada in summer, and in the winter migrates far into South America, while the latter, or yellow-crowned species, is much less frequent and chiefly confined to the sea-coast of the warm parts of America. The squawk is about two feet long, the young brownish, the adults deep green and blue-gray above with two or three very long filamentous white occipital plumes. The night-herons are more active after dark than any other species, and are seldom seen abroad, except in the dusk or on cloudy days.

Many species of herons reside in the warm parts of Africa and Asia, among them being the largest of all, the *A. goliath*.

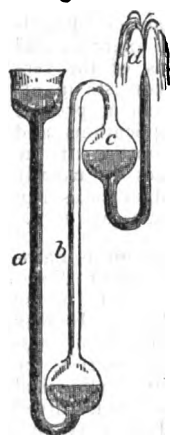
Consult Baird, Brewer and Ridgway, 'Water-birds of North America' (1884); Reichenow, 'Journal of Ornithology' (1877); Job, 'Among the Waterfowl' (1902). See BITTERN; EGRET.

Heroöpolis, an ancient Egyptian city found by excavation in the eastern Delta region. Maps made prior to 1880 generally located the city near the present city of Suez, but the excavations of Naville in 1883 under the auspices of the Egypt Exploration Fund tend to show that the city was farther north. Heroöpolis is given in the Septuagint version of the

Old Testament as the meeting place of Joseph and Jacob. The Coptic translation is Pethom, very similar to the Hebrew Pithom, or "House of Tum," and for some time it has been known from Egyptian geographical lists that Pithom was situated in the land of Theku-t. This name has been identified with Succoth, the second resting place of the Children of Israel in their flight from Egypt. The Naville excavations brought to light the old site of Pithom and Succoth, the excavations being made at Tell el-Mashhutah, twelve miles west of Ismailah. A mile-stone which was recovered then showed the distance between Heroöpolis and Clysma to have been nine miles. This would confirm the view taken by Strabo that the city was at the head of the Red Sea navigation and was situated on what he called "Heroöpolitan Gulf," but if his view be correct, then it can only be inferred that the Red Sea extended at that ancient date further north than it now does and that the place where the Israelites crossed was not where it is generally supposed to be, but considerably further north.

Herostratus. See EROSTRATUS.

Hero's Fountain, a pneumatic apparatus, through which a jet of water is supported by condensed air. A simple mode of constructing it by means of glass tubes and a glass-blower's lamp is shown in the annexed figure. The column of water in the tube *a* compresses the air in *b*; this presses on the surface of the water in *c*, and causes it to gush out at *d*.



Hero's Fountain.

Herpes, an acute, non-contagious, inflammatory disease of the skin, characterized by an eruption of one or more clusters of vesicles upon a reddened base. Several forms of the disease are recognized by dermatologists, of which the commonest are facial herpes, and herpes zoster. Facial herpes constitutes the common fever blister, or cold sore, and is usually seen about the mouth, though it also occurs on other parts of the face. There is often some slight constitutional disturbance preceding the eruption, which first makes its advent known by a sensation of burning or itching in the part, followed by reddish discoloration of the skin and after a few hours by a number of pin-head to pea-sized blisters filled with clear or turbid fluid. After a few days these dry up and form a yellowish crust, which then falls off, leaving a red spot that soon disappears. The usual duration of the disease is about a week and it shows a strong tendency to recur. Herpes often accompanies febrile conditions such as pneumonia and malaria, and a similar lesion is not rare about the genitals. Herpes occurs mostly in those whose skin is irritable or delicate, and is usually the result of some derangement of the mucous membrane of the respiratory, digestive or genito-urinary tract. It sometimes is the unfailing harbinger of the menstrual period. Cold, mental depression, and injury or irritation of the skin are other causes. The disease belongs to the class of the neuroses, and in some instances its presence

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can be explained only on the basis of nerve disturbance. In most cases no treatment is required, as the lesions promptly heal of their own accord, but soothing ointments or lotions tend to relieve the irritation. Herpes zoster, or shingles, is a special form remarkable for the fact that the eruption follows the course of certain nerves, and is usually disposed around one side of the body like a half belt. In rare cases it encircles the body. Its onset is preceded by stinging neuralgic pains, and by languor, lassitude, loss of appetite, shiverings, headache, nausea, quickened pulse, etc., after which the eruption appears in irregular patches. The vesicles become enlarged to the size of small peas in twenty-four to thirty-six hours, and fresh clusters occur for three or four days, completing the belt-like appearance. As the eruption recedes, by the fifth or sixth day, the vesicles become white and opaque, and the red margins grow livid or purple. Sometimes the vesicles burst, and several of the patches run together, forming irritable sores, discharging a thin serous fluid, which concretes and forms a crust that falls off as the parts beneath heal. The disease occasionally follows injuries to the nerves, and it is common in damp, cold weather of spring or autumn, when it sometimes occurs in epidemics. It is sometimes produced by sudden exposure to cold after violent exercise, and sometimes follows acute affections of the respiratory organs. The treatment consists in attention to any systematic derangement present and in the local use of soothing applications, and protective dressings to prevent rupture of the vesicles. The duration of shingles is usually from ten days to three weeks. Most cases run a favorable course and second attacks are rare.

Herpestis, a genus of dicotyledonous gamopetalous plants, of the natural order *Scrophularineæ*, of the tribe *Gratioleæ*, native to the tropical sections of both hemispheres. It may be distinguished by its calyx, as the upper segment is large and ovate, and covers the rest, the other lobes narrow or linear, its cylindrical corolla, four stamens, and two or four-valved capsule. The genus comprises about fifty species of small, creeping herbs, having opposite, or toothed leaves, and generally flowering solitary or in axillary clusters of yellow, blue or white flowers. *H. Monniera* is the common water hyssop, and the natives of India find the juice of this plant, when mixed with petroleum, of great benefit to parts of the body affected with rheumatism. *H. colubrina*, a native to Peru, is used, under the name of *yerba de colubra*, as a remedy for the bites of poisonous animals.

Herpetology, hēr-pě-tōl'ō-jī, the study of reptiles. In its earlier days it included under the term "reptile" not only those now properly so named, but the amphibia (q.v.) and some other "creeping things" not in either group. Cuvier's classification, the first approach to a scientific one, put both the true reptiles and the amphibians as co-related groups under *Reptilia*; but their formal distinction was soon perceived. Huxley showed that in their descent, embryology and structural relations, the amphibians were more closely related to fishes than to the reptiles (lizards, serpents and turtles). He therefore united the two in a superior group *Ichthyopsida*, while he joined the birds to the reptiles in a

group of similar rank called *Sauropsida*. Thus the limits of herpetology have been restricted to truly scientific limits,—the chordate class *Reptilia*, a definite group distinguished by the following characters:

Reptiles are cold-blooded, the temperature of the body not greatly exceeding that of the surrounding medium; the heart is three-chambered, except in crocodilians, where four chambers first occur; mostly venous blood goes from the heart to the anterior viscera, and mixed blood to the posterior region, only the head and anterior regions receiving purely arterial blood; the body is covered with scales, with which sub-jacent bony plates or scutes are sometimes associated; the vertebræ are absolutely gastro-centrous (biconcave); the skull articulates by a single condyle with the backbone, and the lower jaw works against the quadrate bone; the great majority are oviparous, while in some the eggs are hatched within the mother.

This characterization unites into the one class, many orders of wholly extinct types, one order represented by a single living example (the tuatara "lizard"), and the existing tortoises and turtles, lizards, snakes, and crocodiles; and none other is a reptile, properly speaking. The group occupies a central position in the vertebrate series. Above it on the scale of organization are the birds and mammals; beneath it the amphibians and fishes. Similarly reptiles stand in a middle position in geological history, as the Mesozoic, or Secondary Period, was that in which the group flourished, and of which the existing forms are, on the whole, the diminished and degraded remnants. In respect to their phylogeny: "On the one hand, there is not the slightest doubt," declares Gadow, "that they are evolved from some branch of the Stegocephali (q.v.), whilst on the other hand the reptiles, probably through some branch of the Theromorphæ, have given rise to the mammals; some other reptilian branch, at present unknown, blossomed out into birds."

Classification.—The most recent classification of the reptiles, perfected since about 1875 by the enormous amount of information collected in all parts of the world, and especially in the western United States, in regard to fossil forms (see *PALEONTOLOGY*), is that formulated by H. Gadow ('Amphibia and Reptiles,' 1901), expressing substantially the consensus of all specialists, and is as follows:

CLASS REPTILIA.

SUBCLASS I. Proreptilia.—Permian reptiles in which the components of the vertebra remain separate; well developed limbs and girdles fitted for a terrestrial life. The fragmentary remains of these animals are hard to separate definitely from the Stegocephali.

SUBCLASS II. Prosauria.—Chiefly extinct reptiles with deeply amphiœlous vertebræ whose parts are still unfused; movable chevron bones occur in the tail and frequently, with intercentra, in the trunk.

Order I.—Microsauri.—Small Carboniferous and Permian reptiles with dermal armor on the dorsal and ventral side of the trunk and tail; and ribs with head and tubercle. The armor of the skull, and the flat ischia and pubes of the pelvis resemble the condition in Stegocephali.

Order 2.—*Prosauroi*.—Permian to recent, terrestrial, unarmored, generalized reptiles, of which one species (*Sphenodon*, or *Hatteria*, *Punctatum*) still persists in New Zealand (see TUATARA). This animal is distinguished from the lizards with which it was formerly placed by many skeletal characters, such as the fixed quadrate bone and the broad bony roof of the mouth.

SUBCLASS III. *Theromorpha*.—Fossil reptiles with fixed quadrate bone, only one temporal arch, and having pubes and ischia united ventrally in one broad symphysis. This group has an especial interest because it is probably the one from which mammals sprang, and flourished between the Permian and Triassic ages. See THEROMORPHA.

SUBCLASS IV. *Chelonina*.—Reptiles with an upper and lower bony shield, four feet, and toothless jaws—the turtles. There are two orders, *Atheca* and *Thecophora*. See CHELONIA.

SUBCLASS V. *Dinosauria*.—Mesozoic reptiles, having a long tail, powerful hind legs, fixed quadrate bones, and bifurcated ribs. It is divisible into several orders. See DINOSAURIA.

SUBCLASS VI. *Crocodylia*.—Four-footed, long-tailed reptiles, with fixed quadrate bone, teeth in alveolæ and confined to jaws; ischia not united by a symphysis. The group had its origin in the *Dinosauria*, from which it is difficult sharply to separate it, arose in the Mesozoic era, and the early forms were marine. The strict *Crocodylia* first appeared in the lower Jura, and have evolved along two parallel lines of advance, one of which ends in the recent long, sharp-snouted gavials, and the other in the broad, short-snouted crocodiles and alligators (qq.v.). The skin is covered with horny scales or scutes which, in some fossil species formed an osseous armor. The front nasal openings lie on the dorsum of the snout near its apex, and their hinder ends are carried by the broad and deep palate far back into the throat. By this means the alligator can lie submerged with its mouth open so as to bring the nostrils to the surface and thus breath without carrying water into the windpipe. The lungs are large and of complicated structure. The heart has practically four chambers as in mammals. There are three orders: *Pseudosuchia*, early generalized forms, expiring in the Jurassic age; *Parasuchia*, extinct forms of the Jurassic and Triassic periods (See CROCODILE, FOSSIL; BELODON); *Eusuchia*, modern crocodilians. See CROCODILE.

SUBCLASS VII. *Plesiosauria*.—Mesozoic reptiles, with pentadactyle appendages adapted to life in water; fixed quadrate bones, numerous alveolar teeth, and ribs without tubercles. They apparently filled the place of the dolphins of to-day, except that the neck is in most species extremely long. See PLESIOSAURIA.

SUBCLASS VIII. *Ichthyosauria*.—Mesozoic, marine, whale-like, viviparous reptiles, with appendages transformed into paddles. The teeth are conical, lie in a groove and are very numerous. See ICTHYSOSAURIA.

SUBCLASS IX. *Pterosauria*.—Mesozoic aerial reptiles with fixed quadrate and anterior appendages forming wings—the pterodactyls. See PTEROSAURIA.

SUBCLASS X. *Pythonomorpha*.—Elongate marine cretaceous reptiles with movable quadrate bones; appendages shaped like paddles, teeth

fused with jaws. Two orders, *Dolichosauri* and *Mosasauroi*. See MOSASAURUS.

SUBCLASS XI. *Sauria*.—Reptiles with movable quadrate bones and transverse cloacal opening; the most recent of the reptiles, probably originating in the *Prosauroi*. It contains two orders: *Lacertilia* (geckos, lizards, and chameleons); and *Ophidia* (snakes).

Bibliography.—Huxley, 'Anatomy of Vertebrated Animals' (1879); Hoffmann in Bronn's 'Klassen und Ordnungen des Thierreichs' (Leipzig, in progress); Duméril and Bibron, 'Erpétologie Générale' (9 vols. Paris, 1834-54); British Museum Catalogues by Boulenger, etc.; Holbrook, 'North American Herpetology' (1836-42); Zittel-Eastman, 'Text-book of Paleontology' (1902); Gadow, 'Amphibia and Reptiles' (1901).

Herrera, Francesco de, frân-thēs'kō dā ā-r-rā'rā, called EL VIEJO (the Elder), Spanish painter: b. Seville 1576; d. Madrid 1656. He broke with the Italian traditions of Spanish painting and became the founder of the Spanish national school. He also worked in bronze, and it was this probably which gave rise to the charge that he was connected with counterfeiters. He had a disposition so very detestable that his pupils, of whom Velasquez was one, all left him. The Louvre contains some of his works, among others 'The Israelites Gathering the Quail in the Wilderness.' But the best are at Seville, including the 'Last Judgment,' in the Church of San Bernardo; 'Saint Peter,' in the Cathedral; and 'Moses Smiting Water from the Rock,' one of four large canvases in the archiepiscopal palace. His frescoes at both Madrid and Seville have quite disappeared.

Herrera, Francisco de, called EL MOZO (the Younger), Spanish painter: b. Seville 1622; d. Madrid 1685. He studied art under his father, Francesco, called El Viejo (q.v.) (to whom he was very far inferior as a painter), and remained some years at Rome. He was a founder of the Seville Academy (1660), and became its vice-director. Subsequently he was appointed court-painter to Philip IV. In the Seville Museum is his 'Four Doctors of the Church Adoring the Host'; in the Prado Museum, 'Saint Hermenegild.' During his residence in Italy he painted fish with such success that he was known there as 'Lo Spagnuolo dei Pesci.'

Herrera, José Joaquín de, hō-sā' hō-ā-kēn, Mexican military officer: b. Jalapa 1792; d. Tacubaya 10 Feb. 1854. He joined the Mexican army in 1809, and in 1821 was promoted brigadier-general. He aided in overthrowing Iturbide, when the latter became emperor, and was successively minister of war and president of the supreme court. President for a brief period in 1845, he again held office in 1848-51. During the war with the United States, he was aide to General Santa Anna.

Herreshoff, hēr-rēs-hōf, John B., American shipbuilder: b. Bristol, R. I., 1841. Under his management the Herreshoff Manufacturing Company succeeded Edward Burgess in designing and building the fastest yachts in the world. Although he has been blind since the age of 15, he has always been active in business.

Herreshoff, Nathaniel Greene, American shipbuilder: b. Bristol, R. I., 1848. He was

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educated at the Massachusetts Institute of Technology, and was graduated Sc. M., at Brown University. He is superintendent of the Herreshoff Manufacturing Company, and has designed many torpedo-boats and yachts, notably those sloops which have engaged in the international races of recent years.

Herrick, Christine Terhune, American writer on domestic economy: b. Newark, N. J., 1859. She has published: 'Housekeeping Made Easy' (1888); 'The Little Dinner'; 'Liberal Living Upon Narrow Means'; 'First Aid to the Young Housekeeper' (1900); 'The Expert Maid-Servant' (1902); 'Consolidated Library of Modern Cooking and Household Recipes' (1905); etc.

Herrick, Clarence Luther, American college president: b. Minneapolis, Minn., 21 June 1858; d. 1903. He was graduated from the University of Minnesota in 1880, and after holding professorships at Denison University, Ohio, and the University of Chicago, became president of the University of New Mexico at Albuquerque.

Herrick, Myron T., American capitalist and politician: b. Huntington, Lorain County, Ohio, 1854. He studied at Oberlin College and Ohio Wesleyan University, went to Cleveland in 1875, and taking up the study of law was admitted to the bar in 1878. He soon gave up the profession of law, however, and organized the Euclid Avenue National Bank, from this time onward being prominent in financial circles. At first secretary of the Society for Savings Bank in Cleveland, he became its president in 1894, and has been connected with various railroad and other large financial enterprises. He has taken a keen interest in national and local politics from a Republican standpoint, in 1903 was elected governor of Ohio, but in 1905 was defeated by John M. Pattison.

Herrick, Robert, English poet: b. London, Aug. 1591; d. Dean Prior, Devonshire, October 1674. His father, Nicholas Herrick, was a goldsmith; through inheritance and training the son was enabled to transfer to the making of verse the exquisiteness of his father's craft. Shortly after Robert's birth the elder Herrick made his will, and two days later he died, under circumstances that suggested suicide. To his wife and his seven children he left a small property.

After a few years, perhaps at Westminster School, and a brief apprenticeship to his guardian uncle, William Herrick, also a goldsmith, the poet entered Cambridge University, at first enrolling himself in Saint John's College. Two years later he removed to Trinity Hall, intending to study law. During his residence he seems, from letters to his guardian, to have frequently needed money, and he left the university in debt. He took his degree of B.A. in 1617, and of M.A. in 1620.

Few facts remain of his next years. He went to London and associated with the poets of the time, admirers of Ben Jonson, and he himself wrote verse. The words of two New Year anthems set to music by Henry Lawes were his; through the friendly influence of prominent men at court, he may have been known to the King and Queen. By 1627, when he was chaplain of the Duke of Buckingham's expedition to the Isle of Rhé, he must have

taken orders. Two years later, shortly after his mother's death, he became vicar of Dean Prior in Devonshire.

So little in Herrick's poetry suggests the priestly character that question has been made why he took orders at all; he himself spoke of his Devonshire years as pure exile from London and the world. Yet the traditions of his career at Dean Prior are entirely pleasant. His parishioners remembered him for his good humor and wit. He wrote his best poems in the little vicarage, whether in celebration of Prudence Baldwin, his housekeeper, or of Tracy, his spaniel, or of the village holiday ceremonies and superstitions, recorded with wonderful sympathy. Nothing more particular remains, save the legend of his keeping a pet pig in the house, and of his hurling a missile at an inattentive congregation—his only practical expression of ill-will towards Devonshire.

In 1647, evicted as a loyalist by Parliament, he returned to London, glad to be free of the quiet country, and set about publishing his poems. They appeared that same year, under the title of 'Hesperides, or The Works Both Humane and Divine of Robert Herrick, Esq.' The sacred poems bear the separate title, 'His Noble Numbers; or, His Pious Pieces, Wherein (amongst other things) he sings the Birth of his Saviour; and sighs for his Saviour's Suffering on the Crosse.' Nothing else is known of Herrick until 1662, when Charles II. restored him to his old place at Dean Prior. The parish register records his burial on 15 Oct. 1674.

There is almost no contemporary reference to Herrick's poems, but the frequency with which they were reprinted in collections proves the favor they found. By the end of the century, however, they were forgotten, sharing in the Augustan neglect of Elizabethan and Stuart poetry. A mention of Herrick, with some of his poems, in the *Gentleman's Magazine*, 1796, and Dr. Nathan Drake's essays and quotations in his 'Literary Hours,' two years later, revived his fame.

Herrick's literary master, as he tells us in more than one fine tribute, was Ben Jonson (q.v.). Campion and the poets of the later song-books foreshadow him, but it was through Jonson that he derived the tradition of Horace and the Latin epigrammatists, and he remained Latin in spirit, though his own carefully achieved simplicity is often near to Greek restraint. But it is not only in this literary inheritance that he belongs with Jonson; personally, if the Marshall portrait prefixed to 'Hesperides' is faithful, and if the assault upon the drowsy congregation is no fable, he illustrates with Jonson and other Elizabethans, and with Landor in later days, the paradox of violent and robust temperament reacting in fastidious art.

Herrick is first of all an artist; his merit is almost invariably a virtue of expression; he is master of the inevitable phrase. Many of his lyrics have indeed a larger perfection of form, yet he is most often concerned with the single word. His shortest poems, the numerous two-line fragments in which at first sight he would seem to scatter his genius, are frequently mere experiments in diction, usually for the sake of one word that he coins or discovers, easily recognizable for its curious awkwardness or its complete beauty. For among these trial pieces can be found some unhappy ventures, as well as astonishing verbal felicities.

This gift for language, part of the poetical equipment in general, is more marked in Herrick because of its intensity and its narrowness. It is so narrow as to be quite inflexible; far from exhibiting the Elizabethan faculty for adjusting the style to the most varied matter, Herrick subdues to one manner every subject he treats. The lines to his dying brother, the wedding songs for his friends, the epitaph on his housekeeper, and the recipes for country charms, are uttered alike in one voice and in one rigid though lovely tone. And in his choice of subjects he exercises none of the fine selection that distinguishes his diction; his conscious art is a thing of words only; in his themes he is at once almost the coarsest and the daintiest of English poets. This imperturbable manner, itself exquisite, becomes in the handling of shockingly different themes Herrick's chief limitation; here is felt a certain hardness of character, an ill-proportioned sympathy, or some deep defect of heart. But this impression is partly corrected elsewhere in his work.

The themes of Herrick's secular verse, upon which his fame rests, are given with characteristic confusion in the first poem of his book. He sings of youth and love—a Renaissance motive from which his cheerfulness or his limited sympathy subtracts most of the Renaissance sadness at the passing of beauty. He sings of his own numerous loves in the Horatian manner, leaving his admirers room to ponder whether he ever loved at all. He sings in his kindest vein of fairy lore, and of country holidays; he identifies Renaissance Springtime motives in the native village ceremonies around him, and gives to the English May festival something of the significance it had in Provence; and he is the first writer to chronicle at length that old English Christmas spirit which Irving and Dickens recovered. No poet who writes of such subjects with such delight can be altogether unsympathetic, and in the verses which are frankly about himself there is a frequent note of human pathos that partly disarms criticism of his less felicitous themes.

It is not surprising that his 'Noble Numbers' are little read; in them as in his secular verse he is the technical experimenter, the conscious artist, where conscious art is out of place. But in the 'Christmas Carols,' in the 'Graces for Children,' in the fine though fantastic 'His Saviour's Words Going to the Cross,' in the epigram 'Riches and Poverty,' and in the lines that Swinburne praised, 'Devotion Makes a Deity,' he shows feeling and thoughtfulness not unworthy of England's tradition of devout country parsons.

Bibliography.—The best editions are those by Grosart, Saintsbury (Aldine), and Pollard, with an introduction by Swinburne, in the 'Muses' Library.' For criticism, consult: 'Introductions' to the above; Gosse, in 'Seventeenth Century Studies'; Aldrich, in 'Ponkapog Papers,' and Ward's 'English Poets.'

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Herrick, Robert Welch, American novelist: b. Cambridge, Mass., 26 April 1868. He was graduated at Harvard in 1890, and in 1895 became professor of English at the University

of Chicago. His literary style displays much finish, while his studies of character are both keen and discriminating. He has published: 'The Man Who Wins' (1895); 'Literary Love Letters and Other Stories' (1896); 'Love's Dilemmas' (1898); 'Composition and Rhetoric' (1899); 'The Web of Life' (1900); 'The Real World' (1901); 'Their Child' (1903); 'The Common Lot' (1904); 'The Memoirs of an American Citizen' (1905); etc.

Herrick, Sophie McIlvaine Bledsoe, American microscopist: b. Gambier, Ohio, 26 March 1837. She was editor of the 'Southern Review' 1875-8, and has since been connected with the editorial staff of 'Scribner's Magazine' and its successor, 'The Century.' She has published 'Wonders of Plant Life under the Microscope' (1883); 'The Earth in Past Ages'; 'Chapters in Plant Life'; 'A Century of Sonnets' (1902).

Herring. The typical fishes of the family *Clupeida* (q.v.), to which also belong the shad, alewife, sardine (qq.v.), and other food-fishes, the numbers of which consumed makes this the most important economically of all families of fishes. The true or sea-herrings belong to the genus *Clupea*. The common herring (*C. harengus*) of both sides of the North Atlantic swims in enormous schools containing countless numbers of individuals packed as closely as possible over areas of often 6 to 20 square miles. The herring is a migratory fish, but its movements are so complicated that much mystery still clings to them. The most satisfactory conclusions have been arrived at by a German commission appointed to study the natural history of the Baltic, etc., which concluded that the herrings live in the deep water off the coasts which they approach periodically chiefly for the purpose of spawning; that there exist a large number of distinct races, differing in size, form, times of spawning, and various other peculiarities, and that each of these races swims in separate schools, which move independently and have different seasons and grounds for spawning. Spawning takes place at various seasons, according to locality, some schools spawning in the late winter, others in the spring, and still others during the autumn months. The eggs are small and adhere in masses to seaweeds, stones, etc., on the bottom. Vast numbers are thus deposited in certain favored localities to which haddock and other fishes are attracted for the purpose of devouring them. The number of eggs produced by each fish is not especially large, being from 10,000 to 50,000, but nevertheless the natural productiveness of the herring has been sufficient to overcome inroads caused by the fisheries and the much greater destruction due to the hordes of bluefish, sharks, porpoises, gulls, and other enemies which accompany the schools in order to prey upon them. Having only few and small teeth, the herrings cannot capture active living creatures, but, as they swim with quick, nervous movements, water is being continually taken into the mouth and strained through the gill-rakers. By this means great numbers of copepods and other minute forms of life, especially larval crustaceans, annelids, and mollusks, are retained within the mouth and swallowed.

The herring fishery is of stupendous importance to the countries of northern Europe.

HERRING GULL—HERSCHEL

This is especially true of the Scandinavian countries, whose hardy fishermen take from the sea annually not less than 1,500,000,000 pounds. Scotland takes from 150,000,000 to 200,000,000 pounds, and the other maritime nations usually smaller quantities. On this side of the Atlantic the fishery is much less extensive, but is growing, and is no doubt destined to reach a great magnitude, especially in the waters of British America, which furnish each year about 250,000,000 pounds. Although found as far south as North Carolina, the herring has a commercial importance only north of Cape Cod, the New England fisheries, which are chiefly confined to Maine, yielding in 1908 75,000,000 pounds, worth \$796,000. Most of these were sold fresh, either for food, or, early in the season, for cod bait; of the remainder, about 7,000,000 were salted and nearly 4,000,000 smoked. A favorite preparation is the partly smoked form of "bloaters." Large quantities of young herrings are packed and sold as sardines. In the prosecution of the American fisheries use is made chiefly of several forms of drift or gill nets and seines; under favorable conditions of great tidal movements, as in the Bay of Fundy, great numbers are captured in weirs.

A closely similar species (*C. pallasii*) is found on the Pacific coast of America, and is the object of a rapidly extending fishery. Of the anadromous river-herrings or alewives (*Pomolobus*), two species are of great commercial importance on the Atlantic coast of the United States, particularly southward, though the fisheries extend from Maine to Florida. They enter the rivers to spawn about the same time as the shad, with which they are caught chiefly in pound nets and seines. In 1908, 2,500 persons were employed in the fishery, the product of which was about 60,000,000 pounds, valued at \$589,000. The greater number are smoked.

To the extensive literature of the herring the following references will serve as an introduction: Goode, 'Fishery Industries of the United States' (1884); Smith, 'Alewife Fisheries of the United States,' in Report of United States Fish Commission for 1898; Cunningham, 'Marketable Marine Fishes'; 'Report of the Commission for the Scientific Investigation of the German Seas' (a very important contribution in German); 'Annual Reports' of the United States Commissioner of Fisheries.

Herring Gull, the most numerous and widely spread of gulls, common in the breeding season throughout all the northerly parts of the world, and migrating southward in winter. The silvery sheen of white and pearl-blue plumage are indicated in its technical name (*Larus argentatus*); and its habit of following schools of fishes and picking them up gives it the name of herring-gull. The same name is often given, however, to several others of the smaller gulls. See GULLS.

Herrnhut, hĕrn'hoot, a small town or village in the kingdom of Saxony, in the circle and 18 miles southeast of Bautzen. It is situated at the foot of Hutberg Mountain, 1,054 feet above the level of the sea. It was founded by Count Zinzendorf 1722, for the use of the Moravian Brethren, and it afterward became the metropolis and centre of that sect of Christians, who, from this town, are often called Herrnhuters. (See UNITED BRETHREN.) The town

is built with great regularity, and distinguished by the order, cleanliness, and stillness which prevail in it. It has a great variety of manufactures, principally of linen, calico, tobacco, and of articles in gold, tin, leather, etc. The objects of curiosity are the observatory and the burial-ground on a neighboring hill, resembling a garden, and called by the brethren "Garden of Peace." Pop. 1,200.

Her'ron, Francis Jay, American soldier: b. Pittsburg, Pa., 17 Feb. 1837; d. New York 8 Jan. 1902. He was graduated at the Western University of Pennsylvania in 1854, and on the breaking out of the Civil War commanded the Governor's Grays in the First Iowa regiment. In 1861 he was made lieutenant-colonel of the Ninth Iowa regiment. In 1862 he received the commission of brigadier-general of volunteers. Early in 1863 he joined Gen. Grant at Vicksburg and commanded the left wing of the besieging forces as major-general (1862), until the capture of the city. He subsequently captured Yazoo City, with its boats and supplies; commanded the Thirteenth army corps, and broke up the traffic along the Rio Grande, assisted President Juarez against Maximilian's forces, and in June 1865 received the surrender of the Confederate forces west of the Mississippi. In 1873 he took up his residence in New York, where he practised law until his death.

Herron, George Davis, American clergyman and social reformer: b. Montezuma, Ind., 21 Jan. 1862. He was educated at Ripon College, Wisconsin, and also studied in Europe. He became pastor of the Congregational Church in Lake City, Minn., and while there made an address ("The Message of Jesus to Men of Wealth") before a Minneapolis club, which attracted much attention; he subsequently received a number of calls from important churches, and went as pastor to Burlington, Ia. Here he organized a club for the discussion of social questions, which was largely attended, especially by workingmen. In 1893 he accepted the chair of applied Christianity at Iowa College, resigning in 1900 on account of the objection to his teachings; he then organized a religious and socialist movement known as the "social crusade." In 1901 he divorced his wife, and married a second time, an action which aroused much criticism. He has written: 'The Larger Christ' (1891); 'The Call of the Cross' (1892); 'A Plea for the Gospel' (1892); 'The New Redemption' (1893); 'The Christian Society' (1894); 'The Christian State' (1895); 'Social Meaning of Religious Experiences' (1897); 'Between Cæsar and Jesus' (1899).

Herschel, hĕr'shĕl, Caroline Lucretia, sister of Sir William Herschel (q.v.), German astronomer: b. Hanover, Germany, 16 March 1750; d. there 9 Jan. 1848. In her 22d year she went to England to reside with her brother, then organist in Bath. When William abandoned his former profession in favor of astronomy she became his helpmate, and when he was appointed private astronomer to George III. she discharged efficiently all the duties of an assistant astronomer, for which she was allowed a small salary. Although these duties were very arduous, she yet found time to conduct a series of observations of her own with a small Newtonian telescope her brother had made for

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HERRING GULL (*Larus Argentatus*)

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her. She devoted special energy to the discovery of comets, and was so successful as to be entitled to claim the priority of discovery of at least five. Several remarkable nebulae and clusters of stars included in her brother's catalogue were described from her original observations. In 1798 her valuable work, 'A Catalogue of Stars taken from Mr. Flamsteed's Observations, with Introductory Remarks by W. Herschel,' was published by the Royal Society. On her brother's death in 1822 she returned to her native country, where she died after an unusually protracted life, distinguished by useful scientific labors. The Royal Society recognized the value of her labors by bestowing upon her in 1828 their gold medal, and some time afterward by conferring upon her the privileges of honorary membership.

Herschel, Sir John Frederick William, English astronomer; only son of Sir William Herschel (q.v.): b. Slough, near Windsor, 7 March 1792; d. Collingwood, Kent, 11 May 1871. He was educated at Eton and Cambridge. His first publication was 'A Collection of Examples of the Application of the Calculus to Finite Differences' (1820), but it was not until the death of his father that he devoted his special attention to those astronomical researches which have made the name of Herschel so famous. He limited his first exertions to a re-examination of the nebulae and clusters of stars discovered by his father, and in 1824, with James South, reported to the Royal Society the position and apparent distances of 380 double and triple stars, obtained by more than 10,000 measurements. This memoir attracted the notice of the French Academy, and they voted it their astronomical prize; and two years later the gold medal of the Royal Society was awarded to each of the astronomers. The results of the re-examination were given in 1833 to the Royal Society in the form of a catalogue of stars in order of their right ascension. The catalogue contained observations on 525 nebulae and clusters of stars not noticed by his father, and on a great number of double stars, between 3,000 and 4,000 in all. His 'Treatise on Sound' appeared in the 'Encyclopædia Metropolitana' in 1830, as did his 'Treatise on the Theory of Light' in 1831, in which year also appeared his well-known 'Preliminary Discourse on the Study of Natural Philosophy,' one of the most charmingly written books on science. In 1831 he was created a knight of the Royal Hanoverian Order. In 1833 Herschel published in Lardner's 'Cabinet Cyclopædia' a 'Treatise on Astronomy,' subsequently enlarged into 'The Outlines of Astronomy,' of which several editions have been published. Before this, however, he had undertaken a private expedition to the Cape of Good Hope for the purpose of carrying out in the southern hemisphere observations similar to those he had made in the northern. Four years were spent near Cape Town (1834-7). His great object was to discover whether the distribution of the stars in the southern hemisphere corresponded with the results of his father's labors, prosecuted mainly on the opposite side of the Galactic Circle. That the observations might be strictly comparable they were made by the same method as Sir W. Herschel, and with a telescope of the same optical power. The whole number of stars counted in the telescope amounted to 68,948, in-

cluded within 2,299 fields of view. By a computation based on the star-gauges in both hemispheres relative to the Milky Way, Sir John found that the stars visible in a reflecting telescope of 18 inches aperture amounted to 5,331,572; and, more than this, the number really visible in the telescope was vastly greater, for in some parts of the Milky Way the stars were found to be so crowded in space as to defy all attempts to count them. The results of this vast labor were published in 1847, expense being borne by the Duke of Northumberland. On Herschel's return to England in 1838 he was received with every public honor, and on the queen's coronation was created a baronet. In 1848 he was president of the Royal Astronomical Society. He was buried in Westminster Abbey.

Herschel, Sir William, Anglo-German astronomer: b. Hanover, Germany, 15 Nov. 1738; d. Slough, near Windsor, England, 25 Aug. 1822. He went to England in 1757, and at first was employed in the formation of a military band. Although enthusiastically fond of music, he devoted his leisure hours to mathematics and astronomy; and being dissatisfied with the only telescopes within his reach, he set about constructing one for himself, in which undertaking he succeeded, having in 1774 finished a reflecting instrument of 5½ feet. Encouraged by his success he proceeded to complete larger telescopes, and from this period gradually withdrew from his musical engagements. Late in 1779 he began a regular survey of the heavens, star by star, with a 7-foot reflector, and after 18 months labor discovered, 13 March 1781, a new primary planet, named by him the *Georgium Sidus*, but now known as *Uranus*. George III. gave him a pension, enabling him to devote the rest of his life to astronomy. At Slough, he commenced the erection of a telescope of the dimensions of 40 feet, and completed it in 1787. Its diameter was 4½ feet, and it weighed 2,118 lbs. With this powerful instrument he continued to prosecute his discoveries, regularly communicating the results to the Royal Society till 1818. In 1783 he thought he had discovered a volcanic mountain in the moon, and from further observations made with his large instrument in 1787 found he was the victim of an optical illusion. He discovered two of the satellites of Saturn, and the fact that his system of rings revolved, and he measured his rotation and that of Venus, announced to the world that there were binary stars in the heavens, etc. Herschel received much assistance in making and recording observations from his sister Caroline (q.v.); and latterly his brother, a skilful optical instrument-maker, lent him valuable aid. In 1802 he laid before the Royal Society a catalogue of 5,000 new nebulae, nebulous stars, planetary nebulae, and clusters of stars he had discovered. See 'Herschel, his Life and Works,' by Holden (1881).

Herschell, Farrer, Lord, English lawyer and statesman: b. London, England, 2 Nov. 1837; d. Washington, D. C., 1 March 1899. He was educated at University College, London, and the University of Bonn. He became a barrister of Lincoln's Inn in 1860; was recorder of Carlisle 1873-80; solicitor-general 1880-5; and lord high chancellor in 1886, and again 1892-5. He was a member of the Venezuela and British Guiana boundary arbitration tribunal in 1897,

and was subsequently appointed one of the high joint commissioners from Great Britain, on the Anglo-American Commission, designed to settle existing differences between the United States and Canada, of which he became president. During the sitting of the commission in Washington, D. C., in February 1899, he had a severe fall, from the effects of which he died shortly after.

Hertel, hĕr'tĕl, Albert, German painter: b. Berlin 19 April 1843; studied at the Berlin Academy, where he became professor in 1875, and was made a member in 1901. Among his landscapes are 'Olive Harvest in Capri' (1872); 'After the Storm on the Coast of Genoa' (1878); 'Road Between Rapalla and Santa Margherita' (1892); and 'View in the Roman Campagna' (1896).

Hertel de Rouville, ħr-tĕl dĕ roo-vĕl, Francis, Canadian soldier: b. Three Rivers, Maurice County, Quebec, 1643; d. 1722. He was captured in 1681 and tortured by the Iroquois who were so struck by his fortitude that they adopted him into their tribe, from which he escaped and as one of Frontenac's lieutenants performed some remarkable exploits against the English from whom he captured Falmouth, now Portland. Louis XIV. tardily rewarded him with a patent of nobility.

Herter, Albert, American artist: b. New York 2 March 1871. He studied painting at Paris in the studio of Jean Paul Laurens. He has twice visited Japan and the years spent there have strongly influenced the character of his work. He is member of the Society of American Artists, of the Water Color Club, and of the Water Color Society.

Hertz, Heinrich, hĭn'riĥ hĕrts, German physicist: b. Hamburg 22 Feb. 1857; d. Bonn 1 Jan. 1894. He studied at the University of Berlin, and in 1880 became assistant to Helmholtz there. In 1883 he was lecturer on theoretical physics at the University of Kiel; in 1885 was professor of physics at a technical school in Karlsruhe; and in 1889 succeeded Clausius as professor of physics at the University of Bonn. His most important work was his experiments with electricity, by which he proved that electricity can be transmitted in electromagnetic waves with the same rapidity as light, these waves showing the same phenomena of refraction, polarization, etc., as light waves. He thus further developed and attested the truth of Faraday's electro-magnetic theory of light. It is by means of the Hertzian waves also that wireless telegraphy (q.v.) is made possible.

Heruli, hĕr'ū-li, a Teutonic tribe first heard of in history about the middle of the 3d century, who passed south from the coast of the Baltic and swept with the Goths into the eastern provinces of Rome and founded an empire on the Danube. They appear as reinforcements of Odoacer in his invasion of the western provinces of Rome in 476. Their king Rudolph formed an alliance with Theodoric the Great, but they were afterward conquered by the Longobardi. A part of them were driven toward Scandinavia, a part lingered on the borders of the Roman empire. They did good service to the Byzantine empire, but after encountering the Vandals in Africa, and the Ostrogoths in Italy, they vanished from history.

Herzl, Theodor, Jewish leader of political Zionism: b. Budapest 2 May 1860; d. 3 July 1904. He was educated in Vienna for the law, but devoted himself almost exclusively to journalism and literature. He was at first Paris correspondent and later literary editor of the *Neue Freie Presse*, and wrote comedies and dramas. In 1896 he published his 'Judenstaat,' the English translation of which ('A Jewish State') made him the political leader of the Zionist movement; and his efforts were at once centred in this propaganda. 'Die Welt' of Vienna was established by him in 1897, and in that year he planned and was elected president of the first Zionist Congress held at Basel. At every subsequent congress (the sixth having been held in August 1903) he was unanimously re-elected. In 1898 he inaugurated a series of diplomatic interviews with various sovereigns and statesmen. At the Hague Peace Conference he was received by many of the delegates. In the Zionist movement he was officially the chairman of the *Grosses Actions Comité*, and of the Vienna executive committee, and a member of the council of administration. Among his further works are: 'Das Neue Ghetto' (1903), directed against the Jewish element that combated his views; 'Altneuland' (1903), a fictional presentation of Zionist ideas.

Herzegovina, hĕrt-sĕ-gō-vĕ-nā, Austria-Hungary, a province of the Balkan peninsula nominally belonging to European Turkey, but since 1878 administered along with Bosnia (q.v.) by Austria. It is bounded on the north by Croatia and Bosnia, on the east by Bosnia, on the southeast by Montenegro, and on the south and west by Dalmatia; length, northwest to southeast, 140 miles; breadth, 50 miles; area, 700 square miles. The surface is generally mountainous, covered by ranges belonging to the Dinaric Alps, sloping gradually to the Adriatic, which receives all its drainage chiefly by the Neretva. It contains many fertile valleys, and raises excellent tobacco. The exports consist chiefly of hides, tallow, cattle, wool, wax, and fruit. Mostar is the chief town. The province was conquered by the Turks in 1465. An insurrection, caused by Turkish misgovernment, broke out in July 1875, and was the cause subsequently of war between Russia and Turkey. In accordance with the Treaty of Berlin (1878) the province was occupied by Austrian troops, and is now ruled by an Austrian military governor. Pop. about 250,000.

Hesiod, hĕ'si-ōd, Greek poet: b. Ascra, a village of Bœotia, at the foot of Mount Helicon, whence it is called the *Ascræan*. But little is known of Hesiod with certainty. Even the age in which he lived cannot be precisely determined. A very common tradition relates that, in a poetical contest with Homer at Chalcis, he came off victorious. Herodotus calls him a contemporary of Homer, and says they lived 400 years before himself (about 900 B.C.). In his 'Works and Days' (172) Hesiod says that he belonged to the period immediately following the Trojan war; but there are many reasons for supposing that he lived at a later period. Of the numerous works attributed to him three only remain. These are the 'Theogony,' a collection of the oldest fables concerning the birth and achievements of the gods, arranged so as to form a connected whole. It is the most

HESPERIDES — HESSE

important and difficult of all his works. With it was probably connected the lost 'Catalogues of Women' (or the *Eoiai megalai*), to the fourth book of which the second fragment (the 'Shield of Heracles') must have belonged. This is evidently composed of three distinct parts, only one of which is occupied with the real description of the shield. The third fragment is a didactic poem, 'Works and Days' (*Erga*, or *Erga kai Hemerai*). It treats of agriculture, the choice of days, etc., with prudential precepts concerning education, domestic economy, navigation, etc. The Hesiodic poems are inferior to the Homeric in almost every respect. Hesiod's complete works have been translated into English verse by Elton, and Bohn's Classical Library contains a prose version.

Hesperides, hēs-pēr'i-dēz (daughters of Hesperis), the guardians of the gold apples which Ge (the Earth) had given to Hera on her marriage. They were the daughters of Atlas and Hesperis, but their parentage is differently represented by other writers. They were four in number and their names were Agla, Arethusa, Erytheia, Hesperia, or Hesperarethusa. They were assisted in the charge of their garden by the sleepless dragon, Ladon. It was the twelfth labor of Heracles to bring the golden apples of the Hesperides to Eurytheus.

Hesperornis, hēs-pē-rōr'nīs, a remarkable extinct form of bird, the remains of which are met with in the cretaceous deposits of Kansas. As described by Prof. Marsh, it possessed small pointed reptilian teeth, which were implanted in a deep continuous groove, somewhat like those of Ichthyosaurus. Its brain was small and more reptilian in type than that of any adult bird as yet examined. It appears to have been a large diving-bird, measuring over five feet from the point of the bill to the end of the toes. Its wings were rudimentary, its legs powerful, and its feet well adapted for rapid progression in water. The tail was broad, could move up and down, and was probably used as a rudder or swimming-paddle. The long slender jaws were united in front only by cartilage, as in serpents, and had on each side a joint which admitted of some motion, so that "the power of swallowing was doubtless equal to almost any emergency." Consult: Lucas, 'Animals of the Past' (1901).

Hesperus, hēs-pē-rūs, among the Greeks the planet Venus, when it appeared as evening star, personified as the divinity that at weddings leads the bride to the arms of her husband. He is called Phosphorus or Lucifer as a morning star, and is styled the son of Eos (Aurora) and Cephalus. He was also known as son or brother of Atlas, and brother of the Hesperidæ.

Hesperus Peak, an elevation of the La Plata Mountains, in the southwestern part of Colorado. Gold and silver have been mined in the vicinity. This peak is one of a group of high peaks in the vicinity of the State; the height is about 13,135 feet.

Hesse, hēs, or **Hessia** (German, HESSEN, hēs'sēn), Germany, an ancient territory inhabited in the time of the Romans by the Catti or Chatti, an old Germanic tribe. Under the Frankish kings Hesse was governed by counts, the principal of whom were the Counts of Gudensberg of the name of Giso. Philip I. the Generous, who

succeeded to the sovereignty of the whole country in 1509, and who was the earnest and zealous friend of the Reformation, divided his dominions among his four sons. The eldest, William IV., obtained one half, including the capital, Cassel; Louis IV. one fourth, comprising Marburg; Philip II. one eighth, with Rheinfels; and George I. also an eighth, with Darmstadt. But Philip dying in 1583, and Louis in 1604, without children, there remained only the main branches of Hesse-Cassel and Hesse-Darmstadt (qq.v.).

Hesse, Grand Duchy of, formerly HESSEN-DARMSTADT, Germany, a state consisting of 13 divisions. Eleven of these are small, six surrounded by Prussian territory, and five on the borders of Baden and Württemberg. The other two portions, forming about nine tenths of the whole, are separated by a belt of land stretching east to west, and including part of the Prussian dominions. The more southerly of these portions forms the two provinces of Rheinhessen and Starkenburg. The northern portion, forming the province of Oberhessen, is surrounded by the Prussian province of Hesse-Nassau; area of whole grand duchy, 2,964 square miles. Oberhessen is generally mountainous; Starkenburg and Rheinhessen are also mountainous; in the southwest the Donnersberg, a northern ramification of the Vosges, rapidly subsides to the extensive plains belonging to the valleys of the Main and the Rhine. To the latter river the whole surface of the grand duchy belongs, with exception of a small portion in the north, drained by the Eder and Fulda, affluents of the Weser. The climate is greatly diversified, varying with the altitude. The soil, particularly in the provinces of Starkenburg and Rheinhessen, is fertile, and grain of all kinds is raised in large quantities. Hemp, flax, potatoes, and rape-seed also are extensively grown, and in particular districts tobacco and hops. The vine forms an important object of culture, and fruit is abundant. Horses, cattle, sheep, and swine are numerous. The minerals include iron, coal, lignite, and salt; and there are good quarries of sandstone, limestone, whetstones, basalt, and roofing-slate. The most important manufacturing industry is linen. The principal towns are Darmstadt, the capital; Mainz, Giessen, Bingen, and Worms. The grand duchy is an hereditary monarchy. The constitution dates from 1820, but was somewhat modified in 1856 and 1872. The legislative power is vested partly in two chambers—an upper, composed chiefly of nobility and citizens, appointed for life by the grand-duke; and a lower, composed chiefly of deputies from the towns, villages, and rural districts. About two thirds of the inhabitants are Protestants. Pop. about 1,200,000. The grand-ducal line was founded in 1567 by George I., son of Philip the Generous. By the death of the landgrave of Hesse-Homburg, in 1866, Louis III., grand-duke of Hessen Darmstadt, succeeded to his dominions. In the German war of that year Hessen-Darmstadt joined Austria. Its army was nearly annihilated at Friedberg, and it was deprived of the newly-acquired landgraviate and other districts. In 1870 the grand duchy of Hesse entered the German empire. Louis IV., who succeeded Louis III., died in 1892. He was the husband of Princess

hesse-cassel — hessians in the revolution

Alice of Great Britain, and their son, Ernest Louis, is now the reigning sovereign.

Hesse-Cassel, hēs-kās'el, or **Electoral Hesse**, Germany, a former electorate and independent member of the Germanic Confederacy, between Rhenish Prussia and Bavaria, containing 4,430 square miles, with about 850,000 inhabitants, mostly Protestants. It was founded by the eldest son of Philip the Generous, the Landgrave William IV., surnamed the Wise (1567-92). For a long period the history of Hesse-Cassel was a narrative of conflicts between the people for political freedom and the elector for absolute rule. The demands of the people were on several occasions strengthened by appeals to the elector from the Prussian government. On the outbreak of the German war of 1866, the elector joined Austria, and his territory was occupied by Prussian troops. On the conclusion of the war Hesse-Cassel was annexed to the Prussian territories, and now forms part of Hesse-Nassau (q.v.).

Hesse-Nassau, hēs'nās'ā, or **Hessen-Nassau**, hēs'sēn-nās'sow, Germany, a province of Prussia, which includes the former principality of Hesse-Cassel (except some small districts), the greater part of the former duchy of Nassau, that portion of the former landgraviate of Hesse-Homburg which lies on the right bank of the Rhine, the territory and town of Frankfort, and some small districts ceded by Hessen-Darmstadt and Bavaria. The province is bounded by the Prussian provinces of Westphalia, Hanover, Saxony, and the Rhineland, the principality of Waldeck, the grand duchy of Saxe-Weimar, and the kingdom of Bavaria; area, 6,018 English square miles, divided into the two governments (Regierungsbezirke) of Cassel and Wiesbaden. The greater part of this province has a rugged surface, partly covered by branches of the Harz Mountains. The principal rivers are the Werra, Lahn, Ohm, Rhine, and Main. Arable land is limited, and cultivation is chiefly confined to the narrow valleys and lower hill slopes, amounting to about two fifths of the whole surface. The principal crops are rye, barley, and oats. Potatoes also are extensively grown. Fruit is tolerably abundant, and a great part of the loftier districts is covered with extensive forests, which employ a considerable number of the inhabitants, and furnish one of the most valuable sources of revenue. There are various minerals, and valuable mineral waters at Homburg, Wiesbaden, etc. The manufactures consist chiefly of woollens, cottons, and linens. The principal towns are Cassel, the capital, Wiesbaden, and Frankfort.

Hessen-Darmstadt, hēs'sēn-därm'stāt. See HESSE, GRAND DUCHY OF.

Hessian Fly. See WHEAT INSECT PESTS.

Hessians in the Revolution, The. In the 18th century Germany was divided into nearly 300 sovereignties, each maintaining a court and a military force. The possible revenue was often very limited, the burdens were almost intolerable, and the princelings were often profligate and cruel; they did not need their forces for home defense, and were glad to make money for themselves by letting out their regiments for hire, though except in one case they remitted no

taxes on the people from the receipts. There was also a lingering tradition that soldiering was an honest trade like any other, and that it was useful for helping sovereigns to keep order; especially to put down insurrections, which were wicked. This, however, did not apply to rulers hiring out their troops and pocketing the money; and not only the liberal school of writers and public men, but enlightened despots like Frederick the Great, denounced it. But England had not sufficient army for the American War, and wished drilled troops rather than raw recruits, and after vainly endeavoring to hire 20,000 Russian soldiers, turned to the German princes, with some of whom she had dynastic relations, and all of whom were so eager to sell their wares that two of them offered soldiers for hire immediately after Bunker Hill, without waiting to be asked. Only those which could furnish considerable numbers were worth treating with, and all the German auxiliaries were finally hired from six states; about half being from two Hessian states, and by far the largest (more than three times greater than any other) from one. All were indiscriminately termed "Hessians," as all German immigrants were formerly called "Palatines." The first treaty was made with the Duke of Brunswick, 9 Jan. 1776, for 4,300 troops; reinforcements or replacements were sent year by year, till the total had amounted to 5,723, only 2,708 of whom ever returned. The second was with the Landgrave of Hesse-Cassel, 15 Jan. 1776, for 12,805; finally increased to 16,992, of whom 10,492 returned. The contingents from the others, under various treaties, amounted to—Hesse-Hanau, 2,038; Anspach-Baireuth, 2,353; Waldeck, 1,225; Anhalt-Zerbst, 1,152. Total sent to America, 29,867, of whom 17,313 returned; the rest either died or remained as citizens. There were about 20,000 in America at any one time after 1776. These forces cost Great Britain in subsidies and incidentals about £1,770,000; besides the lump sum, it was obliged to replace the dead, and at least in one case count three wounded men as one dead one.

About 18,000 were shipped in 1776; the commander-in-chief was Lieut-Gen. Philipp von Heister, a veteran of the Seven Years' War. The first division of some 8,000 landed at Staten Island, 15 August; they included a body of chasseurs and grenadiers under Lieut. E. W. F. von Donop, an able and daring officer. They took a leading part in the battles of Long Island and White Plains, and all the operations for capturing New York; and stormed Fort Washington with a loss of 56 killed and 276 wounded. During this time the second division of about 4,000, under Lieut-Gen. Wilhelm von Knyphausen, joined them. Washington's surprise at Trenton fell on Col. Rall's brigade of Germans. Rall was a regular officer whose contempt for the ragged Americans surpassed that of the most arrogant Briton, and he refused to take the most elementary precautions; he was mortally wounded. Early in 1777 Heister was superseded by Knyphausen; Howe finding the former intractable, and the Landgrave of Hesse laying the blame of Trenton upon him. Meantime the Brunswickers and a Hanau regiment under Baron von Riedesel had made a clearance of Canada; and in 1777 they were

joined to the expedition of Burgoyne, in whom Riedesel had no faith. It was from this division that Baum's detachment was sent off to raid Vermont, and to meet its fate at Bennington, with Breymann's sent to support it; 365 of Baum's 374 Germans did not return, and 231 of Breymann's were killed, wounded, or captured. Riedesel and his remaining men shared in Burgoyne's surrender. Around Philadelphia, at Brandywine and Germantown, Knyphausen's command was of the first importance; and at Red Bank Donop tried to storm the American fort and was mortally wounded, his command losing 82 killed and 229 wounded, besides 60 prisoners. In the three years' occupation of Rhode Island, from the fall of 1776 to that of 1779, about half of the British corps was Hessians; and they liked, and were liked by the inhabitants,—when they departed, all persons, but especially women, were prohibited from appearing at the Newport windows, in fear that the soldiers might not wish to go. In the South, at Savannah, Charleston, Pensacola, Baton Rouge, etc., they left many dead; and shared in the bloody drawn battle of Guilford Court House. Finally, at Yorktown, they bore the brunt of the actual fighting, losing 53 killed and 131 wounded.

The Germans did their duty bravely and faithfully, with loyalty to a service they had been sold into to no profit of theirs. Very few deserted, in spite of constant inducements held out to them; a policy which Washington strongly deprecated. Probably one reason was, that they were at once recognizable from their speech. Nor were they in the least inhumane or rapacious: the charge that they were cruel barbarians was a mere political weapon of the time. In a strange country, they would have run the risk of being murdered in reprisal had they been such; but in fact they appear to have been well-meaning men. Of the 29,867 who came over, only 17,313 returned to Germany. Of the 12,554 remaining, 548 were killed; some of the total 1,652 wounded died; some disappeared; but a great number are known to have remained and settled in the country. Grants were given them in Nova Scotia, but many scattered as chance directed. See Lowell, 'The Hessians in the Revolution' (1884).

Hestia. See VESTA.

Hesychius, hē-sīk'ŭs, the author of a Greek lexicon, which has probably come to us in an abridged form, and which he partly collected from former dictionaries, and partly enlarged by many new words and examples from Homer, the dramatic and lyric poets, the orators, physicians, and historians, was a native of Alexandria, and according to the best authorities flourished about the end of the 4th century after Christ. Of the circumstances of his life nothing is known. His lexicon possesses great value, especially of an antiquarian kind, and is the most useful for the study of the Greek language of all the ancient critical writings that are extant. The best editions of his lexicon are Alberti and Ruhnken's (Leyden 1746-66, two vols. folio), and that prepared by Schmidt (Jena, five vols. 1867-68; in a smaller form, two parts, 1864; second edition, 1867).

Hetæra, hē-tē'ra (Greek *hetaira*, a female companion), the name given by the Greeks to a mistress, as opposed to a lawful wife. But the word had various shades of meaning, from a mistress, who might be a wife in all but the legal qualification of citizenship, down to a harlot. The beauty and accomplishments of many of the hetæra occasioned their society to be sought by men of the highest eminence, even Plato and Socrates. No shame was attached to associating with them. Aspasia, the mistress of Pericles, is the most renowned of these hetæra. (See ASPASIA.) Hetæra, less intellectually famous, were Lais, whom Aristippus the philosopher loved, Phryne, and others. They also became famous for their connection with the works of art. Praxiteles made a marble and gold statue of the latter, and she was also the model for his statues of Aphrodite.

Heterogamy. See METAGENESIS.

Heterogenesis, hēt'ē rō jēn'ē sis, or **Heterogeny.** See METAGENESIS.

Heteropoda, hēt-ē-rop'ō-da, a group of small, pelagic, pectinibranch mollusks, which dwell together in the open sea, have the foot modified into a swimming organ, and are provided with a ventral sucker. The shells are spiral or shaped like that of an argonaut and seem as if composed of thin glass; indeed, the whole animal is beautifully transparent. Heteropods occur in enormous abundance at the surface of the sea in all the warmer parts of the world, and their dead shells sinking to the bottom form a large constituent of the abyssal ooze. They are highly organized, have well developed eyes and other organs of sense, are bisexual, and produce eggs in long cylindrical cords. The young in their development pass through a trochosphere and then a veliger stage. All are predatory, seizing and feeding on the numerous minute forms of life about them. They are most active in the early evening, darting about with twisting motions like worms, usually on their backs. They use the ventral sucking-disk for attaching themselves to any object they may encounter. Three families, containing many species, are known, and their closest affinities are with the pteropods. Consult Kingsley, 'Standard Natural History,' Vol. I. (1885).

Heteroptera. See HEMIPTERA.

Het'man (Russian, Ataman), chief of the Cossacks, formerly elected by that people. He had the power of life and death, and was head of the army in time of war. Mazeppa in 1708 revolted against Russia, taking the side of Charles XII. of Sweden, and Peter the Great abolished in consequence the power and authority of the hetman. Catharine II. suppressed the office and title in the province of Ukraine; it still exists among the Cossacks of the Don. In Poland the commander-in-chief of the army was styled hetman, and was appointed by the sovereign. The last elective hetman of the Cossacks in Russia was Platoff 1812-14. On his death the grand duke, heir to the throne, was made hetman.

Hetty Sorrel, in George Eliot's 'Adam Bede' (1859), a dairymaid whose unfortunate career, condemnation to death, and final reprieve form an important part of the story.

HEVELIUS—HEWITT

Hevelius, Johannes, yō-hān'nēs hā-fā'lē-oos, or hē-vē'lī-ūs, known also as JOHANNES HEVEL, Polish astronomer: b. Dantzic 28 Jan. 1611; d. there 28 Jan. 1687. After visiting the principal countries of Europe he settled in his native city, and from 1639 till his death applied himself almost exclusively to the study of astronomy. His 'Selenographia,' or description of the moon, published in 1647, was the first of numerous astronomical works of great value and authority on his favorite science. Halley, who visited Hevelius at Dantzic at the request of the Royal Society of London, of which Hevelius had been elected a member in 1664, reported favorably of the correctness of his observations. In 1661 he observed a transit of Mercury, a triumph confined to Gassendi alone of all preceding astronomers. Hevelius ranks next to Flamsteed among the men of his day as a diligent and accurate observer of the heavens.

Hewes, hūz, Joseph, American patriot; a signer of the Declaration of Independence: b. Kingston, N. J., 1730; d. Philadelphia, 10 Nov. 1779. He was educated at Princeton College, and about 1760 he removed to Edenton, North Carolina. He soon became a member of the colonial legislature, and was a delegate to the General Congress at Philadelphia 1774-7 and again in 1779. After taking his seat he was appointed on a committee to "state the rights of the colonies in general, the several instances in which those rights are violated or infringed, and the means most proper to be pursued for obtaining a restoration of them," and aided in the preparation of its report.

Hewett, hū'ēt, Waterman Thomas, American Germanic scholar: b. Miami, Mo., 10 Jan. 1846. He was graduated from Amherst College in 1869 and has been professor of German language and literature at Cornell University from 1870. He has been general editor of Macmillan's 'German Classics' since 1895, and beside frequent contributions to periodicals has published among other works 'The Friesian Language and Literature' (1879); 'History of Cornell University' (1894).

Hewitt, hū'īt, Nathaniel Augustus, American Roman Catholic clergyman: b. Fairfield, Conn., 27 Nov. 1820; d. New York 3 July 1897. He was graduated from Amherst College in 1839 and was for several years in the Episcopal ministry. He became a Roman Catholic in 1846 and joined the Order of Redemptorists. He was later one of the founders of the Congregation of Saint Paul (Paulists) taking the religious name of "AUGUSTINE FRANCIS," and subsequently becoming professor and superior in the Paulist Seminary, New York. He wrote 'Life of Princess Borghese' (1856); 'Problems of the Age' (1868); 'Light in Darkness' (1871); etc.

Hewitt, hū'īt, Abram Stevens, American manufacturer and politician: b. Haverstraw, Rockland County, N. Y., 31 July 1822; d. New York 18 Jan. 1903. He was graduated from Columbia in 1842 at the head of his class, and in 1843 he was made acting professor of mathematics there; he also began the study of law, and was admitted to the bar in 1845. He did not practise, however, but shortly after went into the iron and steel business with his father-in-law, Edward Cooper. By careful and skilful

management he built up the financial success of his firm (Cooper & Hewitt); which was the first to manufacture iron girders and supports for fire-proof buildings and bridges, and also furnished the government with large quantity of material during the Civil War. In dealing with his employees, he was particularly successful, never having any serious trouble; it was his policy to keep the works running and the men employed, at least part of the time during dull seasons, though the business was sometimes carried on at a loss. At the time of his death he was recognized as one of the foremost iron masters in the country, his firm controlling the Trenton Iron Co. and the New Jersey Iron and Steel Co. He organized the Cooper Union Institute (q.v.), and as the secretary of the board of trustees largely shaped and controlled its policy for a number of years. He also gave largely to the institution. He was first active in politics at the time of the reorganization of Tammany Hall after the overthrow of the Tweed Ring. He served in Congress 1874-8, and again 1880-6 and was always especially prominent in all matters pertaining to finance, advocating a low tariff and the gold standard. In 1876 he was chairman of the Democratic National Committee, and immediately after the election issued a proclamation to his party stating that Tilden had been elected; later he supported the policy of Tilden which resulted in the appointment of the Electoral Commission (q.v.). In 1886 he was nominated for mayor of New York by Tammany and other Democratic organizations and after a hard campaign won the election over Henry George and Theodore Roosevelt. As mayor he gave the city a most efficient administration, but his independent policy often antagonized the Tammany leaders, especially his strict enforcement of the excise law. He was not renominated by his party, and was defeated as a candidate on an independent ticket in 1888. While mayor he urged in one of his annual messages the need of improvement of the city's rapid transit, and advocated municipal ownership; though his suggestions were not heeded at the time, he continued his interest in the subject, and it was largely due to his efforts that recent improvements in that direction were undertaken; in recognition of his services the Chamber of Commerce presented him with a gold medal in 1901. In February 1903 a number of prominent citizens of New York set on foot a movement to raise a memorial fund of \$500,000 to be presented to Cooper Union as the 'Abram S. Hewitt Endowment of the Cooper Union.'

Hewitt, John Napoleon Brinton, American ethnologist and linguist: b. on the Tuscarora reserve, Niagara County, N. Y., 16 Dec. 1859. For several years he assisted Mrs. Erminnie Smith (q.v.) in the linguistic researches she was making for the Bureau of Ethnology on the Tuscarora reserve, and he is now employed in linguistic work at the Smithsonian Institution.

Hewitt, Peter Cooper, American capitalist and inventor: b. New York 1861. He is the son of Abram S. Hewitt (q.v.), was educated at Stevens Institute, Hoboken, and Columbia College. He entered business with his father and invented improvements in the processes of the Peter Cooper glue factory, which the Hewitt firm controls. Turning his attention to electricity

he invented the Cooper Hewitt lamp and static converter. The lamp in its present form consists of a glass tube of any desired shape with a bulb at one end which contains a small quantity of mercury. All air is exhausted from the tube, which thereupon fills with vapor from the mercury in the bulb. Electrodes are provided at each end of the lamp, the negative electrode in the bulb of mercury and the positive electrode at the opposite end. On passing a direct current through the lamp the vapor which fills the tube is rendered incandescent and gives off a steady, blue-white light. Owing to the great resistance at the negative electrode to the initial flow of current, it is necessary to use a high voltage to start the lamp. This is commonly done by passing a spark from a "choking" coil through the negative electrode, which when once penetrated offers but slight resistance to the flow of current. If for any reason the current is interrupted, the high resistance is immediately resumed and must be broken down again before permitting further flow of current.

The light given off by this lamp is entirely lacking in red rays, and consequently does not reveal the real color of the objects it falls upon. It is, however, of great value as a photographic illuminator being rich in actinic rays, which most affect the photographic plate. Mr. Hewitt is investigating with a view to discover means to turn some of the rays of the incandescent vapor into red rays. This discovery will be a means of great economy, because the Cooper Hewitt lamp is probably the cheapest artificial light in the world. The mercury vapor lamp consumes one half watt per candle-power, as against $3\frac{1}{2}$ watts in the incandescent lamp.

Hewlett, hū'lēt, **Maurice Henry**, English author: b. London 22 Jan. 1861. He was the son of Henry Gay Hewlett, a writer of some little note, and was educated at the London International College, Isleworth. He was admitted to the bar in 1891, and in 1896-1900 was keeper of the land revenue records and enrolments. His reputation was made as an interpreter of the more recondite phases of the life and thought of the Middle Ages, especially in Italy. His style is a skilful medium for his purpose, but frequently so archaized as to be somewhat difficult. His books are: 'Earthwork out of Tuscany' (1895), a collection of Italian studies; 'The Masque of Dead Florentines' (1895); 'Songs and Meditations' (1897); 'Pan and the Young Shepherd' (1898); 'The Forest Lovers' (1898), his first popular success; 'Little Novels of Italy' (1899); 'Richard Yea-and-Nay' (1900); 'New Canterbury Tales' (1901); 'Fond Adventures' (1904).

Hexam'eter (from the Greek ἕξ, six, and μέτρον, a measure), a verse of six feet. It is the heroic or epic measure of the Greeks and Romans, the finest examples of which are the two poems ascribed to Homer, the Iliad and the Odyssey, and the Æneid of Virgil. The sixth foot is always a spondee (two long syllables) or a trochee (a long and a short). The five first may be all dactyls (one long syllable and two short), or all spondees, or a mixture of both. The scheme of this verse then is —

— — — — —
— — — — —

with all the varieties which the mingling of the two kinds of feet, as mentioned, affords; as,

— — — — —
Forte sub arguto consederat ilice Daphnis;
or, — — — — —
Qui Baviū non odit amet tua carmina, Mævi;

and so on. The variety of which the hexameter is susceptible, its great simplicity, its harmony, and its numerous pauses, constitute the charm of this verse, and adapt it to the most various subjects. A spondee is rarely used in the fifth foot, and then in Latin the word with which the verse ends is generally composed of four syllables, and the fourth foot at least must be a dactyl; as,

Cara deūm soboles, magnum Jovis incrementum.

The prevalence of the dactyl or spondee in the hexameter depends much upon the genius of the language; thus the dactyl is more frequent in Greek than in Latin, and in German than in Greek. It is evident that the hexameter cannot be formed in such languages as Italian, French, Spanish and English, whose prosody is regulated by the accent and not by the quantity of the words.

The French and Italian writers, however, early attempted the hexameter, as well as Sidney and Southey in English; but without success. More recent English poets have also tried it, as Clough and Kingsley. Longfellow has made use of the hexameter in his 'Evangeline.' But in no modern European language have hexameters become naturalized, except in German, to which this measure seems as well adapted as to the Greek. Fischart attempted the German hexameter in the 16th century. In the middle of the 18th century it was used by Klopstock, Uz, and Kleist. Goethe's hexameters are very often as poor as their sense is beautiful. John Henry Voss improved the German hexameter by the excellent translation of Homer and his valuable 'Zeitmessung der deutschen Sprache' (Königsberg 1802).

Hexapoda, hēk-săp'ō-dă, a group name for the six-footed arthropods, or true insects (*Insecta*), excluding spiders, myriapods and other forms often included in the term 'insects.' *Hexateuch*. See PENTATEUCH.

Hexoic Acid, an organic acid having the formula $C_6H_{10}O_2$, or $C_6H_{11}COOH$, and occurring in fats, in cheese, among the products of the butyric fermentation of sugar, and in the fruit of *Heracleum sphondylium* and in the flowers of *Satyrium hircinum*. It is best prepared by the fractional distillation of crude fermentation butyric acid. It is an oily substance, very clear and mobile, solidifying at about 29° F., and boiling at 400° F. It has a specific gravity of 0.95, and is oxidized by nitric acid to acetic and succinic acids. It is also known as 'caproic acid,' and its salts are sometimes called caproates, and sometimes hexoates.

Heyse, Paul, powl hī'zē, German poet and novelist: b. Berlin 15 March 1830. He studied classics in his native city, in 1852 traveled in Switzerland and Italy, and two years later he settled in Munich on the invitation of King Maximilian II. of Bavaria, who granted him a pension. He has lived mainly in Munich ever since, devoted almost exclusively to literature. His first work was 'Jungbrunnen, Märchen

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eines fahrenden Schülers' (Tales of a Traveling Scholar) (1850); and to the same year belongs his tragedy 'Francesca da Rimini.' 'Die Brüder' (1852) and 'Urica' (1852), were narrative poems, and formed part of the volume entitled 'Hermen' (1854), later 'Novellen in Versen,' which did much to establish his reputation. Heyse's genius has found its most perfect expression in his tales or novelettes (Novellen), and in this department of literature he holds almost a unique place among German writers. His work is almost throughout highly finished and artistic, and shows a rich imagination and great fertility in invention. His tales have been published in more than 20 collections, and a selection appeared in 1890 under the title 'Auswahl fürs Haus.' His early successes in narrative verse were followed by such works as: 'Die Braut von Cyperin' (1856); 'Thekla' (1858); 'Rafael' (1863); 'Syritha' (1867); 'Der Salamander' (1879); 'Die Madonna im Ölwald' (1879); 'Liebeszauber' (1889). His best plays are those of his third period, and some of them, especially 'Hans Lange' and 'Kolberg,' have been acted with great success. 'Mary of Magdala' was well received in America. Among them are: 'Die Hochzeit auf dem Aventin' (1886); 'Gott schütze mich vor meinen Freunden' (1888); 'Hans Lange' (1866); 'Kolberg' (1868); 'Die Weisheit Salomos' (1887); 'Weltuntergang' (1889); 'Die schlimmen Brüder' (1891); 'Wahrheit' (1892); and 'Jungfer Justine' (1893). His larger novels, 'Kinder der Welt' (1873); 'Im Paradiese' (1875); 'Merlin' (1892); and 'Über allen Gipfeln' (1895), have met with great success. Among other works are: 'Skizzenbuch' (1877); 'Verse aus Italien' (1880); 'Spruchbüchlein' (1885); 'Gedichte' (Poems, 5th ed. 1895; and 'Neue Gedichte und Jugendlieder' (1897).

Heyward, há'ward, Thomas, Jr., American patriot: b. St. Luke's Parish, S. C., 1746; d. there 6 March 1809. He was of much prominence in North Carolina during the Revolution, was a delegate to the Continental Congress 1775-8 and one of the signers of the Declaration of Independence. In later years he was a judge in his native State.

Heywood, John, English dramatist of the first half of the 16th century. He was a paid musician at the court of Henry VIII., with whom he became a favorite on account of his skill in music. Heywood's dramatic works may be classed as interludes, standing between the miracle-plays and the drama proper. The earliest of them, 'A Merry Play between the Pardoner and the Frere, the Curate and Neybour Pratte,' was written before 1521. Another famous piece is 'The Four P's, an interlude in which figure a Palmer, a Pardoner, a Potycary, and a Pedlar.' His allegory of the 'Spider and the Fly' (1556) fully reveals Heywood's religious proclivities. By spiders, the Protestants are meant; by flies, the Catholics.

Heywood, Thomas, English dramatist: b. Lincolnshire. He was educated at Cambridge and appears to have been writing plays as early as 1596. Of all the old dramatists he was the most prolific. We learn from the preface to 'The English Traveller' that down to 1633 he had 'had either an entire hand, or at the least a

main finger,' in the composition of 220 plays; and he continued for some years after that date to write for the stage.

Twenty-four of Heywood's plays have been preserved. The best is 'A Woman kilde with Kindnesse' (1607). His work is usually distinguished by naturalness and simplicity; but he wrote at the beginning of his career one absurdly grandiose play, 'The Foure Prentises of London' (1615), which was parodied in Beaumont, and Fletcher's 'Knight of the Burning Pestle.' 'The Rape of Lucrece' (1608) is chiefly noticeable for its songs; 'Love's Mais-tresse' (1636), dealing with the story of Cupid and Psyche, is fanciful and ingenious; and there is much tenderness in 'A Challenge for Beautie' (1636). 'The Captives, or the Lost Recovered,' an interesting play, acted in 1624, was first published in 1885.

Hezekiah, hēz-e-ki'a (*Hishkiyah*, generally *Hishkiyahu*, strength of Jehovah), the 12th king of Judah. At 25 he succeeded Ahaz about 726 B.C., about 698 B.C. He had no sooner mounted the throne than he initiated a system of reform, on the injunctions of Isaiah, and broke up the idolatrous customs into which the people had fallen during the life of his father. He also endeavored to repair the injury done by national defeats and losses. He purged, repaired, and reopened the temple with magnificent sacrifices and a splendid ceremonial. So extreme was his indignation against idolatry that he destroyed the brazen serpent which was said to be the one used by Moses in his miraculous healing of the Israelites. With patriotic zeal he assumed the aggressive against the Philistines, and not only won the cities lost by his father, but dispossessed them of most of their own. In the 14th year of Hezekiah's reign he had a dangerous illness, which threatened serious complications, and the kingdom was in a difficult crisis, for the king had no heir, Manasseh not being born till long afterward. The greater part of the Scripture records bearing on the reign of Hezekiah is occupied by the two invasions of Sennacherib. Several of the Psalms are supposed to allude to the discomfiture of Sennacherib, for example, xlv. xlviii., lxxvi. Hezekiah did not long survive this deliverance, dying after a reign of nearly 29 years. Among the many highly useful works executed by him, the aqueducts of Jerusalem are of especial importance.

Hiawatha, hi-a-wá'ta or -tha, the hero of an American Indian legend known by this name among the Iroquois and among the other tribes. He is mentioned in various works on the aborigines, and in 1855 was immortalized in the poem, 'Hiawatha,' by Longfellow.

Hiawatha, Kan., city, county-seat of Brown County; on the Saint Joseph & G. I. and the Missouri P. R.R.'s; about 70 miles northwest of Kansas City and 55 miles north of Topeka. It is situated in a rich agricultural region. Its chief manufactures are flour, foundry products and agricultural implements. Its trade is principally in wheat, corn, fruit, live-stock, flour, and lumber. It has the Morrill Public Library and an academy. The city owns and operates the waterworks and an electric-light plant. Another electric-light plant is

owned by a private corporation. Pop. (1910) 2,974.

Hib'bard, George Abiah, American writer of short stories: b. Buffalo, N. Y., 1858. He has written 'Iduna, and Other Stories'; 'Nowadays'; 'The Governor'; etc. His work is marked by finished style and much insight into character.

Hib'ben, John Grier, American logician: b. Peoria, Ill., 19 April 1861. He was graduated from Princeton 1887 and is now professor of logic there. He is author of 'Inductive Logic' (1896); 'The Problems of Philosophy' (1898).

Hibernation, the winter sleep of warm-blooded animals. Under this term is also included the torpidity of frogs, toads, reptiles, certain fishes, insects, the horseshoe crab and snails, which is mainly due to prolonged cold. Among the mammals which hibernate are the bear, dormouse, badger, bat and hamster; a number are incomplete hibernators, as the prairie dog, while squirrels fall into a winter sleep during the coldest weather, but may be seen in warm spells in winter. The males of the black and white bear are more or less active during the winter months, while the females are hibernating. The same species, like the skunk, may in the southern portion of its range not hibernate at all. Neither do the hibernators all retire to their holes or dens or under fallen trees at the same date, but the time varies with the temperature, and different degrees of torpidity are exhibited. It also appears that continuous hibernators do not lay in a supply of food, as do intermittent ones like squirrels; yet the Arctic fox is said to store up a supply of dead lemmings, ermines, geese, etc.

Hibernation is like sleep, and has been compared with trance. During this period the animal functions are nearly suspended, the excretions are greatly diminished and in the bears the rectum is closed by a resinous plug, called by the Swedes "tappen," and by American hunters "seal." The animal heat is lowered to that or nearly that of the air, the action of the heart being slight; there is an increased muscular irritability, and the animal loses from 30 to 40 per cent of weight.

Snakes, lizards, the toad, frogs, salamanders, and certain fishes hibernate, burying themselves in the earth below the reach of frost, the aquatic forms digging into the mud at the bottom of streams. The few fishes which are known to lie dormant and take no food sink into the mud of streams or of the sea. The horseshoe crab burrows in the mud beyond the reach of oyster dredges in November, remaining in deep water until the middle of spring. Most insects hibernate in the larva or pupa state, a few as moths or butterflies. Caterpillars hide under moss, the bark of trees, etc., but they freeze solid and may be broken into two pieces like an icicle. They gradually thaw out in spring; when the changes are sudden, great numbers die. Spiders and snails hibernate under stones, moss, etc., while slugs bury themselves in the mud, and those mussels and other mollusks living in streams and lakes descend into the mud.

Estivation.—In the tropics there is a corresponding period of torpor during the hot, dry season, when food is scarce, and vegetation is taking a rest. Alligators, snakes, certain mam-

mals, as the taurec, insects and land snails become dormant, the latter closing the mouth of their shells with a membrane-like substance (epiphragm), leaving a small opening in it for the admission of air in breathing, yet after a prolonged shower they become active. Thus it is seen that heat, dryness and the lack of food operate in causing estivation, while cold and famine appear to be the cause of hibernation; though all species are by no means affected alike. Among the lowest organisms the dormant vitality of resting spores, seeds of plants, winter eggs of sponges, of polyzoa, the dormancy of certain adult forms, are connected with a lowered temperature, and a resting period is necessary both in plants and animals. The simultaneous shedding of the leaves of deciduous trees is certainly connected with it not caused by cold, and it is undoubtedly true that changes of temperature as well as lack of food, and the need of rest, cause hibernation and summer dormancy.

Hibernia, the ancient name applied to Ireland (q.v.).

Hibernians of American, Ancient Order of, an Irish-American secret society founded in 1836. It has one general or national board, with 3,002 subordinate divisions. There were 250,000 members in 1910. The benefits disbursed the same year amounted to \$414,000. National president (1910), James J. Regan, St. Paul, Minn.

Hibiscus, hī-bis-kūs, a genus of plants of the mallow family (q.v.), distinguished by a double calyx and fruit of three or more many-seeded carpels united into a many-seeded capsule. The species are numerous, natives of warm climates, some trees or shrubs, but most of them large herbaceous plants. Many bear very beautiful flowers, much used in the South Sea Islands in wreaths, etc., for personal adornment. The rose-of-Sharon (*Hibiscus syriacus*), a native of Syria and Carniola, has long been in cultivation as an ornamental shrub. Several other species have become favorite hothouse plants. The scarlet hibiscus (*H. coccineus*) and the rose-mallow (*H. moscheutos*) are among the most striking and beautiful of North American wild flowers, glowing among the reeds of marshes in late summer in flame-color and pink. The characteristic mucilaginous and fibrous properties of the Malvaceæ are very strongly developed in this tribe. The fruit of *H. esculentus*, called gumbo, okra, etc., is in general use for food in the East and West Indies and the United States. It is an annual plant, with a soft herbaceous stem, three to five feet high, crenate leaves, axillary sulphur-colored flowers, and pyramidal, somewhat podlike capsules. The fruit is used in an unripe state, and is generally much esteemed, but is disliked by some on account of its viscosity. It enters as an important ingredient into the pepper-pot of the West Indies, or is used in soups. It also produces a coarse fibre. The bark of *H. tiliaceus*, a tree 20 feet high, with a very thick bole, abounds in mucilage. This tree is one of the most abundant trees of the South Sea Islands; and the wood, being light, tough, and durable, is much used for many purposes. From its fibre the Tahitians manufacture matting. Many other species yield fibres, some coarse, some fine and beautiful, which are used in dif-

ferent countries; but the most important in this respect is *H. cannabinus*, the Deccan hemp of western India (see HEMP). *H. sabdariffa* is very generally cultivated in warm countries, on account of its calyx, which, as the fruit ripens, becomes fleshy, and acquires a very pleasant acidity. It is much used for making tarts and jelly, and a decoction of it, sweetened and fermented, affords a refreshing beverage, well known in the West Indies as sorrel cool drink, the plant being called red sorrel; and in Madras it is used for similar purposes, and is named rozelle or rouselle. Musk-seed (*H. abelmoschus*) is cultivated for its seeds, which have a fragrance between that of musk and that of amber. They are much used by perfumers, and are called *graines d'ambrette*. In Egypt and Arabia they are mixed with coffee, and stimulant and stomachic qualities are ascribed to them. The petals of *H. rosa-sinensis* possess astringent properties, and they are also used by the Chinese to stain their eyebrows and their shoes black.

Hic'cup, or Hiccough, is a spasmodic affection of the diaphragm caused sympathetically by the irritation of structures supplied by nerves communicating with the phrenic nerve. Though generally a slight and passing inconvenience, its occurrence in the last stages of acute disease is a grave symptom, indicating general collapse of the nervous system. It may last only a few minutes or may continue for weeks without being capable of being subdued by any kind of treatment. Fasting or a stimulant suddenly swallowed is one of the commonest causes of hiccup, which generally passes off of its own accord. Nothing removes it more effectually than some active emotion of the mind suddenly excited. Hiccup is a common attendant of dyspepsia, and is often observed in abdominal diseases when terminating fatally, and is especially a symptom in some forms of hernia. Many remedies have been suggested for it, such as holding the breath as long as possible, tying a belt tightly round the waist, and the frequent swallowing of small rounded pieces of ice.

Hi.h'born, Philip, American naval officer: b. Charlestown, Mass., 1839; d. 1 May 1910. In 1869 he entered the United States navy; in 1875 was made constructor, and in 1881 a member of the naval advisory board. From 1893 until his retirement 4 March 1901, he was chief constructor, and as such was identified with the reorganization and enlargement of the new United States navy. He attained rear-admiral's rank, and published a valuable report on foreign dockyards.

Hich'ens, Robert Smythe, English journalist and novelist: b. Speldhurst, Kent, 14 Nov. 1864. He was educated at Clifton College and the Royal College of Music, and after a short career as a musician turned to journalism. In 1893 he visited Egypt for his health, and there conceived the idea which materialized in the 'Imaginative Man' (1895). 'The Green Carnation' (1894), however, epigrammatic and keenly satirical in tone, first brought him into public notice. Later works of his are: 'After To-Morrow' (1895); 'New Love' (1895); 'The Folly of Eustace and Other Stories' (1896); 'The Londoners' (1897); 'Byeways'

(1897); 'The Prophet of Berkeley Square' (1901); etc.

Hick'ey, Emily, English poet: b. Macine Castle, County Wexford, Ireland, about 1845. She was co-founder in 1881 of the Browning Society with F. J. Furnivall (q.v.) and has lectured on English literature. She has published among other volumes 'A Sculptor and Other Poems' (1881); 'Verse Tales, Lyrics, and Translations' (1889); 'Our Lady of May and Other Poems' (1902). Her verse has been highly praised by critics.

Hickey Plot (1776), a conspiracy of the British officials and Loyalists of New York to end the Revolutionary war by the murder or capture of its leaders and the seizure or destruction of its supplies. The heads and probable devisers of it were Governor Tryon, who had fled from the city but remained on a man-of-war in the harbor, and sent supplies of money for bribery, etc.; and Mayor Mathews. The scheme was to kill or seize the patriot generals, and at all events to deliver Washington alive to Sir William Howe, blow up the magazine and secure the passes to the city. Several hundred New York Loyalists were involved. Two of Washington's guard were bought, but a third pretended to accede and revealed the plot. Mathews, a gunsmith named Forbes, and a dozen others were arrested and sent to Connecticut, Mathews carrying the mayoralty flag with him. Thomas Hickey, one of the treacherous guards, was hanged in New York 27 June 1776, the first military execution in the American army.

Hick'man, Ky., town, county-seat of Fulton County; on the Mississippi River, and on the Nashville, C. & St. L. railroad; about 35 miles below Cairo, Ill. It has steamboat connections with the river ports. It is the seat of Hickman College. Its chief industrial establishments are a flour-mill, wagon-factory, two spoke-factories, saw- and planing-mills. Its trade, in addition to its own manufactured articles, is principally in grain and tobacco. Pop. (1910) 2,736.

Hick'ok, Laurens Perseus, American metaphysician: b. Danbury, Conn., 29 Dec. 1798; d. Amherst, Mass., 6 May 1888. He was graduated at Union College in 1820, was licensed as a preacher in 1822, and was pastor successively at Newton and Litchfield, Conn., till in 1836 he was elected professor of theology in the Western Reserve College, Ohio, where he remained eight years. He was professor in the Auburn Theological Seminary 1844-52, and then became professor of mental and moral science, and vice-president in Union College. In 1866 he was formally made president of that institution of which, however, he had been in sole charge for eight years previous. His publications include among other works 'Rational Psychology' (1848); 'Moral Science' (1853); 'Empirical Psychology, or the Human Mind as Given in Consciousness' (1854); 'Rational Cosmology,' (New York 1858), in which he attempts to demonstrate *a priori* the laws of the universe; 'Creator and Creation' (1872); 'Humanity Immortal' (1872); 'Logic of Reason' (1875).

Hick'ory (formerly HICKORY TAVERN), N. C., town in Catawba County; on the Southern railway; near the headwaters of the Catawba

HICKORY—HICKS-BEACH

River; about 43 miles northwest of Charlotte and 50 miles west of Salisbury. The chief manufactures are flour, foundry products, wagons, lumber, leather, boots and shoes. It has several private educational institutions: Claremont Female College, opened in 1880; Saint Paul's Lutheran Seminary; Lenoir College, opened in 1891, under the auspices of the Lutheran Church. Pop. (1900) 2,535.

Hickory, a group of trees of the walnut, forming the genus *Hicoria*, and exclusively North American. They are large strong trees, 60 to 80 feet high, with close shaggy bark and large pinnately divided leaves, pistillate flowers on a terminal peduncle and staminate flowers in long, drooping aments. The fruit is a thick-shelled nut in a tough green husk. There are about 10 species, all natives of the eastern United States and Canada except a Mexican species. The best known of these are the following: Shag-bark, shell-bark or white hickory (*H. ovata*), leaflets 5 to 7, whose bark scales off in great plates curving outward at both ends, and whose nuts are sweeter and better than those of any other species; the northerly "big shag-bark" or king-nut (*H. laciniosa*), leaflets 7 to 9, with narrower "shags," darker wood and big nuts in husks often three inches long; white-heart, or fragrant hickory, or mocker-nut (*H. alba*), noted for the hardness and toughness of its wood; the pignut or broom hickory (*H. glabra*), leaflets 3 to 7, which represents a group of moisture-loving species whose nuts are thin-husked, elongated and bitter and estrigent to the taste. Associated with these is the pecan (*H. pecan*), of the Southern States, whose oblong, thin-shelled nut is one of the most delicious of all nuts, and is now being cultivated in a few places in order to supply the increasing demand. The water hickory (*H. aquatica*) is sometimes called the bitter pecan.

Uses of Hickory-wood.—As timber this wood is of great value for articles requiring great strength with lightness and elasticity; but it is liable to quick decay when exposed to the atmosphere, and for this reason is little used in building, and should be painted. It was the most serviceable of all woods to the aboriginal Americans; and the axe, pick, and tool handles made from it are exported to all parts of the world. It enters into the manufacture of rakes, cradles, and many forms of farm-implements; is largely used in carriage-making, especially for thills, shafts, and the parts of racing-sulkies, the lighter American vehicles owing their acknowledged pre-eminence largely to the availability of this wood. The wood of the various species differs in quality, however; that of the pecan is hard and brittle, and the water hickory soft and comparatively light. The wood of the others is exceedingly strong and tenacious, and weighs about 50 pounds to the cubic foot.

Insect Pests.—A. S. Packard recorded in 1890 170 species of insects attacking the hickories; and Chittenden declared in 1903 that this number could be easily doubled. Hickory appears to be an especial favorite of borers. Prominent among them are the painted hickory-borer, one of the long-horned beetles (*Cyllene picta*); the hickory twig-girdler (*Oncideres cingulata*), twig-pruner (*Elaphidion villosum*), and hickory-bark beetle (*Scolytus quadrispinosus*). This bark-borer is the most

important economic species, and during recent years has been the cause of considerable injury in hickory forests in the State of New York. Consult Packard, 'Insects Injurious to Forest and Shade Trees,' published in 1888 as the fifth report of the United States Entomological Commission.

Hickory Shad. See GIZZARD SHAD.

Hicks, Elias, American preacher of the Society of Friends: b. Hempstead, L. I., 19 March 1748; d. Jericho, L. I., 27 Feb. 1830. While a youth he manifested a talent for public speaking, and at 27 was a well known preacher. For many years he labored zealously in advancing the generally accepted doctrines of the Friends; but having as he believed discovered errors in these tenets, put forth views of his own which he defended with energy and ability. To advance these views he traveled extensively in the United States and in the British provinces, attracting large congregations by his oratory. The result was a schism in the body of Friends; those adhering to the old doctrines being specially termed orthodox, while the followers of Hicks were called after him Hicks-ites. (See FRIENDS.) He was an active abolitionist and with others was instrumental in inducing the State of New York to pass an act which, on 4 July 1827, liberated all slaves within its borders. He was the author of 'Sermons' (1828); 'Observations on Slavery' (1811); 'The Letters of Elias Hicks' (1834); etc. See 'Elias Hicks, Journal of his Life and Labors' (1828).

Hicks, Thomas, American painter: b. Newton, Pa., 18 Oct. 1823; d. 1890. He studied at the Philadelphia Academy, at the National Academy, New York, and afterward in Paris under Couture. Settling in New York he became one of the favorite portrait painters of his day. His pictures in the rooms of the New York Historical Society form an interesting gallery of historic figures, executed with more than ordinary artistic skill.

Hicks, Thomas Holliday, American politician: b. Dorchester County, Md., 2 Sept. 1798; d. Washington, D. C., 13 Feb. 1865. After successively occupying the positions of sheriff, member of the State legislature, member of the State electoral college, and member of the Governor's council, he was in 1858 elected governor of the State. When war was threatened between North and South, although sympathizing with the South and condemning the North's attitude on the slavery question, he sided with the party of neutrality in Maryland and opposed the secession of that State. When there were rumors of a plot formed by 6,000 men of his State to prevent Lincoln's inauguration and seize the city of Washington he suspended the writ of habeas corpus, and planned the arrest of suspected persons. He was the only prominent State official who stood by the Federal government, and at the expiration of his term as governor the new Legislature passed resolutions thanking him for having saved the State from joining the Confederates. In 1862 he was appointed to the senate of the United States and served in it till his death.

Hicks-Beach, Sir Michael Edward, English politician: b. London 1837. He was educated at Eton and Oxford, entered parliament

HICKSON—HIDES AND LEATHER

in 1864, and was made chief secretary for Ireland in 1874, and secretary of state for the colonies in 1898. In 1885 he was appointed chancellor of the exchequer and leader of the Conservative party in the House of Commons. He was president of the board of trade from 1888 to 1892. On the fall of the Gladstone ministry in 1895 he again became chancellor of the exchequer. In October, 1902, he caused a sensation by charging the Balfour government with wasteful expenditure of war appropriations, and in 1903 ably defended the British policy of free trade.

Hickson, Sydney John, English zoologist: b. London 25 June 1859. He was educated at Cambridge and has been professor of zoology at Owens College, Manchester, England, from 1894. He has published 'A Naturalist in North Celebes'; 'The Fauna of the Deep Seas'; 'The Story of Life in the Seas' (1898).

Hidalgo y Costilla, Miguel, mē-gēl' ē-dāl'-gō ē kōs-tēl'yā, Mexican revolutionist, first leader in the Mexican war of independence: b. State of Guanajuato 8 May 1753; shot in Chihuahua, Mexico, 27 July 1811. He was a priest, and in earlier life was simply a man of great acquirements, anxious to promote industry in Mexico, and noted for conscientious fulfilment of his ecclesiastical functions. He is said to have introduced the silkworm into Mexico, and did much to promote the culture of the vine. This conflicted with the policy of the Spanish government, which was to discourage all manufactures or agriculture which could interfere with the revenue, and the vines Hidalgo had planted were destroyed. This drove him to rebellion. Possessing much influence among the Indians, he formed the plan of a general insurrection, which was to take place 1 Nov. 1810; but the plot having been disclosed by one of the conspirators, some of his party were arrested, and he was obliged to precipitate his movements. On 10 September having been joined by three officers of the garrison of Guanajuato, he raised the standard of revolt. His eloquence had a remarkable effect on the multitude who heard him, and when after his oration he unfurled a rude copy of the picture of Our Lady of Guadalupe, the patroness of Mexico, the war assumed the character of a crusade. On 29 September with an army of 20,000 men, mostly Indians, he captured Guanajuato. He took Valladolid and several small places, and soon after was proclaimed generalissimo of the Mexican army, and advanced against Mexico; but finding himself almost without ammunition, was obliged to retreat. During this war the government party declared that the ordinary rules of warfare need not be observed as regarded the insurgents, while the latter retaliated with the most horrible atrocities. On one occasion Hidalgo is said to have massacred 700 prisoners because they were Europeans. After several defeats the insurgents were left at Saltillo under charge of Rayon, while Hidalgo and others went to the United States to obtain arms and military aid. On their way they were captured by a former friend, and finally shot in Chihuahua. He was after his death regarded as a saint by the people, and within a few years the place of his execution was shown to travellers as a holy spot. The town of Goliad, Texas,

was named in his honor, the H, as silent in pronunciation, being omitted and the other letters rearranged. At the founding of the town the name of Hidalgo was still proscribed by the Spanish rulers and the transposition of the letters of his name was made in order to avert the attention of the authorities.

Hid'denite, a yellowish-green or emerald-green, transparent variety of *spodumene*, discovered by W. E. Hidden, in 1880, in Alexander County, N. C. The emerald-green varieties have been used as gems. They resemble the emerald, but show a greater wealth of color on account of their pleochroism.

Hides and Leather. There are few arts, among the many that are used for the benefit of mankind to-day, that are of such ancient origin as that of tanning. It is only necessary to study the carvings upon the monuments that the modern archaeologist has unearthed to ascertain the fact that the old Egyptians were not only acquainted with several processes of tanning and working in leather, but that its preparation was one of the most important branches of Egyptian industry. So far as our knowledge of their methods of work extends, we know that these ancient workmen prepared their tan in earthen vessels and that they were able to preserve skin either with or without the hair attached. Among the Hebrews, who undoubtedly derived their knowledge of the art of preparing leather from the Egyptians, the trade of the tanner was despised, largely because of the bad odor connected with it, and those who followed this source of livelihood were obliged to locate their working places outside the limits of the city. Often they were situated by the side of streams, or on the shore of the sea, as was the case in Joppa, where the building said to have been the house of Simon the Tanner was located on the shore south of the city.

According to the most authentic records the first tannery to be operated in this country was established in Virginia, about the year 1630. A year or two later another tannery was established in New England, in the village of Swampscott, or Lynn, Mass., by Francis Ingalls, a colonist who had learned his trade in Lincolnshire, England. As it was impossible not to recognize the importance of the industry it was greatly encouraged by the colonial authorities, in evidence of which fact there are many laws on the old statute books regulating, not only the manufacture of leather, but the saving of skins needed by the tanners, under serious penalties for noncompliance. For example, a law was passed in Massachusetts, in 1646, prohibiting the exportation of raw hides, or unwrought leather, under heavy penalties which not only affected the shipper, but reacted upon the master of the vessel that attempted to sail with such freight, for these were the days when the small tanners who had shops scattered throughout the country were entirely dependent upon the surrounding neighborhood for their hides, but so effective were the restrictions placed upon importations of skins by the authorities, that leather was relatively more plentiful in the American colonies than it was in England.

One of the most prominent leather manufacturers of the old days was Colonel William Ed-

HIDES AND LEATHER

wards, who sent the first tanned leather to the Boston market in 1794. Beginning his business in Hampshire about 1790, when he was less than 20 years of age, he immediately inaugurated a series of improvements in the mechanical branch of the art, which, as they were afterward adopted and extended by others, were the means of infusing a much-needed spirit of enterprise into the business. In fact, it was the new ideas in mechanism and in the arrangement of the tannery which he evolved that paved the way for the most important improvements which have since been made in the manufacture of leather. The first company in the business to be incorporated also owed its existence to Colonel Edwards' enterprise, for it was his extensive tanneries at Northampton, Cummington, and Chester that were purchased by the men who incorporated the Hampshire Leather Manufacturing Company of Massachusetts, with a capital of \$100,000 in 1809. These works then had a capacity of 16,000 full-grown hides per annum.

By 1810, the tanning industry had extended so widely that there were tanneries in operation in almost every portion of the country. Bark was so plentiful that it was much cheaper than in England, and, as the result, it was not long before the exportations of American leather had attained an aggregate of 350,000 pounds per annum, while the importations were confined to morocco, and some peculiar kinds of English leather which could not then be produced in this country. At this time (1810) the value of all the manufactures of hides and skins was stated by the census office to be \$17,935,447, but, owing to the fact that the census at that time was so crudely conducted that it was very incomplete, it is safe to say that \$20,000,000 would be much closer to the correct figure. From that date, however, the business increased, slowly at times, perhaps, but steadily, until, in 1840, it was reported that there were about 8,000 tanneries in the country, with a capital of \$16,000,000, and employment for fully 26,000 hands. By 1850, the capital had increased to more than \$20,000,000, while the value of the annual product had reached the quite respectable figure of \$38,000,000. In 1860, this product, including the making of morocco and patent leather, had almost doubled, being in excess of \$72,000,000, while, in 1870, the 7,569 establishments in the country were employing no less than 35,243 persons, at an aggregate wage of \$14,505,775, to produce an annual output that was valued at \$157,237,597. At this time the capital invested in this business was reported as being more than \$61,000,000.

As the establishments engaged in the making of leather were enumerated very differently by the census of 1890 and 1880, it is quite impossible to obtain a reliable basis of comparison from the published statistics. In preparing the census of 1880, the government's enumerators not only counted all the smaller businesses, but they must have reckoned twice all that were engaged in both tanning and currying, with the result that they were able to make an aggregate of 5,628 establishments. As the later census enumerators have confined their attention solely to the large establishments the discrepancy is too great to be readjusted by estimate. Thus, for example, the 1890 census reports 1,787 estab-

lishments, while the 1905 census has but 1,049. The other census figures follow:

THE LEATHER INDUSTRY, 1880 TO 1905.

	1880	1890	1905
Capital.....	\$73,383,911	\$98,088,698	\$242,584,254
No. of employees...	40,282	42,392	57,239
Wages paid.....	\$16,503,828	\$21,249,989	\$27,049,152
Cost of material used.....	156,384,117	122,946,721	191,179,073
Value of product...	200,264,944	172,136,092	252,620,980

Among the first patents taken out for the application of any special process in the making of leather was in 1823, when an inventor patented a method of forcing the tanning liquor through the skin by hydrostatic pressure. In 1831, William Drake devised a modification of this method. According to his process two skins were sewed together and the liquid, which was placed in the receptacle thus formed, was permitted to remain until the tanning had been completed. Some years prior to that time a patent had been issued for a method which provided for the suspension of the hides in a closed

LEATHER PATENTS.

PURPOSE FOR WHICH ISSUED	Date of First Patent	Approximate Total Number of Patents to Date
Processes and apparatus for leaching and making extracts from tan-bark.....	Aug. 20, 1797	100
Bark-mills.....	July 20, 1794	100
Processes employing apparatus for tanning leather.....	July 9, 1808	100
Leather-splitting machine...	July 9, 1808	75
Unhairing machine.....	July 22, 1822	75
For rolling leather.....	Oct. 19, 1812	25
Scouring and setting machine	Nov. 21, 1831	70
Tanners' vats and handling appliances.....	Jan. 9, 1834	75
Machines for boarding and graining leather.....	March 25, 1835	35
Compounds for depilating hides and skins.....	June 30, 1836	60
For fleshing machines.....	June 17, 1837	25
Compounds for bating hides and skins.....	Feb. 3, 1838	40
Whitening, buffing, and shaving leather.....	May 10, 1838	30
Compounds and materials for tanning and tawing leather and preparing raw hides...	July 12, 1838	175
Processes for tanning leather	Aug. 1, 1838	275
For currying leather.....	Aug. 1, 1838	25
Machines for stoning, polishing, finishing, glassing, glazing, flinting, creasing, and dicing leather.....	March 15, 1845	75
Compounds for coloring and polishing leather.....	Oct. 9, 1847	40
Methods for manufacturing enameled, japanned, and patent leather.....	Jan. 9, 1855	20
For stuffing leather.....	Feb. 6, 1855	20
For pebbling leather.....	May 6, 1856	30
For employing mineral substances for tawing hides and skins.....	Aug. 4, 1857	20
For stretching leather.....	Feb. 8, 1859	40
Bark-rossing machines.....	Jan. 9, 1863	10
For preserving hides.....	Sept. 11, 1866	15
Machines for shaving or making leather of uniform thickness.....	Sept. 24, 1867	5
Apparatus for blacking leather.....	Sept. 20, 1870	15
Measuring-machines.....	Aug. 28, 1877	25
Striking-out machines.....	March 27, 1883	4

vessel, in which their conversion into leather would be much accelerated by the removal of

all the air by an air-pump. To enumerate all, or even the most important of these inventions within any brief space would be impossible, but the preceding table gives the date when the first patent was issued for each of the details which enter into the manufacture of leather, as well as an estimate of the number of patents that have been issued in each division of the industry up to the present time.

Hides, as the term is generally accepted today, may be conveniently divided into three classes: (1) Hides proper, which consist of the skins of the larger and more common animals, such as oxen, cows, and horses; (2) kips, which comprise the skins of small, or yearling cattle, which are too large to be classified as calfskins, and (3) skins, including those of calves, sheep, goats, deer, pigs, seal, and the various kinds of fur-bearing animals, many of which, including most of the latter, retain their hair after tanning. The heavy hides are converted into sole, belt, and harness leather; the calfskins are chiefly used for material for the manufacture of the uppers for leather shoes and boots, and are also in much demand by bookbinders; the sheepskins are used for a large variety of purposes, including linings for shoes, aprons, cushions, and covers, gloves, women's shoes, bellows, whips, etc.; the goatskins are used almost exclusively in the making of gloves and ladies' shoes—the morocco leather so extensively manufactured until recent years having now given place to the cheaper and more durable "glazed kid"; the hogskins are utilized in the making of saddle-leather, traveling bags, etc., while dogskins, because of their thin and tough characteristics, are particularly useful in the manufacture of gloves. The durability of the porpoise-skin has recommended its use in the making of shoe-strings, while the buffalo, alligator, kangaroo, deer, elephant, hippopotamus, rhinoceros, walrus, and shark, are among the many other creatures whose skins are utilized in various fields of manufacture after they have left the hands of the tanner.

There is probably no vegetable growth containing tannin that has not been tried by those who are interested in discovering the best and most economical methods of tanning leather, but, while nearly all of them have met with some favor, oak-bark is now held to be the best agent obtainable for this purpose. Among the other tannages that have been utilized with success, however, one may mention hemlock-bark, union, Dongola, alum, chrome, combination, electric, sumac, and gambier.

Practically the only change that has taken place in the tannage process of sole-leather is represented by a slight diminution in the time required for the work, but as experiments are constantly being made along these lines it is believed that the day will come when such leather will be turned out in as many days—perhaps hours—as it now takes weeks. The change that has already been made along these lines in the preparation of the lighter skins has been almost as radical. The introduction of Dongola kid, in 1880, completely revolutionized the manufacture of kid or morocco. It was the discovery of James Kent, of Gloversville, N. Y. The system of tanning, or tawing by the use of chromium compounds, was discovered as early as 1856 by a German chemist, but each of the

many experiments which followed this discovery had failed because there was no known method by which the tannage could be made permanent. At last it was found that hyposulphite of sodium contained the long-sought remedy, and by this process the tannage was made lasting. It was due to this discovery, and to its successful application, that some of the largest and best equipped leather manufactories in the world have since been established in the United States.

Hierarchy, hī'ē-rār-kī (From Gr. *hieros*, sacred, and *arche*, government), sacred government or "the administration of sacred things," first used by the pseudo-Dionysius in the 5th century in his work on the Celestial and Ecclesiastical Hierarchies. It is now generally used to signify the body of officials in the Church organically graduated in their ranks and orders from the supreme head to those in the most subordinate position. In the Roman Catholic Church a threefold distinction is recognized: (1) A hierarchy of divine right, which embraces, under the primacy of the popes, bishops, priests, and deacons. This hierarchy is held by Church to be of divine institution. (2) A hierarchy by ecclesiastical right, consisting of the Roman pontiff and the three original divine orders and of the five minor orders (two in the East), subdeacons, acolytes, exorcists, lectors, and porters (*ostiarii*). (3) A hierarchy of jurisdiction, which includes all the judicial and administrative authorities, ordinary and delegated, charged with the maintenance of the faith among Christians, its union, its discipline, and its general care and supervision. All its powers proceed from the pope as primate, either expressly or by implication. In this category are ranked cardinals, patriarchs, exarchs, metropolitans, and archbishops, and as deriving their powers from these, archpriests, archdeacons, rural-deans, vicars-general, etc. The Anglican Church also recognizes a hierarchical rank in its body, comprising bishops, priests, and deacons. The other Protestant bodies practically reject hierarchical government.

Hiero, I., hī'ērē, king of Syracuse in Sicily: d. Catania, 467 B.C. He was brother and successor of Gelon. Hiero's reign, though less glorious than the preceding, was marked by a peculiar splendor on account of his generous encouragement of learning. Though some blemishes tarnish the first years of Hiero's reign, he compensated for his first faults by the noble actions which signalized the remainder of his life. A long sickness was the main cause of this alteration. Since he could no longer occupy himself with the cares of royalty, he collected around him a society of learned men, and thus becoming acquainted with the pleasures of learning, he never afterward ceased to value it. His court became the rendezvous of the most distinguished men of his time. The names of Simonides and Pindar appear among those of his most constant companions, and when Æschylus left Greece, he betook himself to Hiero, to close his days in his kingdom. He was several times victor in the Grecian games.

Hiero II., king of Syracuse: b. before 306 B.C.; d. 216 B.C. He was the son of Hierocles, a noble Syracusan, who claimed a descent from the family of Gelon. During Hiero's reign began the first Punic war, and he was able, by his

adroitness, to preserve the friendship of both Romans and Carthaginians. The glory of Hiero and the prosperity of Syracuse culminated in the period which intervened between the first Punic war and the second; for in that season of peace Hiero enacted wise laws, and was devoted to the happiness of his subjects. His encouragement of agricultural pursuits enriched him and doubled the revenues of the state. He left the crown to his grandson Hieronymus.

Hieronymus. See JEROME, SAINT.

Hieroglyphics, hi'ē-rō-glīf'iks (from Gr. *hieros*, sacred, and *glypho*, engrave), the inscriptions sculptured on buildings in Egypt, with the implication that the writing was confined to sacred subjects, and legible only by the priests. The term has also been applied to picture-writing in general, such as that of the Mexicans and the still ruder pictures of the North American Indians. Two different modes of hieroglyphic writing were used by the ancient Egyptians, the hieratic, and the demotic. Pure hieratic writing is the earliest, and consists of figures of material objects from every sphere of nature and art, with certain mathematical and arbitrary symbols. Next was developed the



Cartouche of Kleopatra, i.e. Kleopatra.

middle hieratic or priestly writing, the form in which most Egyptian literature is written, and in which the symbols almost cease to be recognizable as figures of objects. Hieratic writings of the third millennium B.C., are extant. In the demotic or enchorial writing, derived directly from the hieratic, the symbols are still more obscured. The demotic was first used in the 9th century B.C., and was chiefly employed in social and commercial intercourse. Down to the end of the 18th century scholars failed to find a clue to the hieroglyphic writings. In 1799, however, M. Bouchard, a French captain of engineers, discovered at Rosetta the celebrated stone which afforded European scholars a key to the language and writing of the ancient Egyptians. It contained a trilingual inscription in hieratics, demotic characters, and Greek, which turned out to be a decree of the priests in honor of Ptolemy V., issued in 195 B.C. The last paragraph of the Greek inscription stated that two translations, one in the sacred and the other in the popular Egyptian language, would be found adjacent to it. In deciphering these inscriptions the discovery of an alphabet was the first task. The demotic part of the inscription



Cartouche of Ptolemy, i.e. Ptolemaios.

was first examined by De Sacy and Akerblad, and the signification of a number of the symbols ascertained. The hieratic part was next carefully examined and compared with the demotic and Greek. At last after much study Champollion and Dr. Thomas Young, independently of each other, discovered the method of reading the characters (1822), and thus provided a clue to the decipherment of the ancient Egyptian writing.

Hieroglyphic characters are either ideographic, that is, using well-known objects as

symbols of conceptions, or phonetic, that is, representing words by symbols standing for their sounds. The phonetic signs are again divided into alphabetical signs and syllabic signs. Many of the ideographic characters are simple enough; thus the figure of a man, a woman, a calf, indicate simply those objects. Others, however, are less simple, and convey their meaning figuratively or symbolically. Water was expressed by three zigzag lines, one above the other, to represent waves or ripples of running water, milk by a milk-jar, oil by an oil-jar, fishing by a pelican seizing a fish, that is, fishing; seeing and sight by an eye; and so on. The nature of the phonetic hieroglyphs, which represent simply sounds, will be understood from an explanation of the accompanying cuts.

(1) The first hieroglyph in the name of Kleopatra is a knee, which is *kne* or *kle* in Coptic, and represents the K of Kleopatra. (2) The second hieroglyph in Kleopatra is a lion couchant, which is *laboi* in Coptic, and *labu* in the old Egyptian, and represents the L of both names. In Kleopatra it occupies the second place, and in Ptolemaios the fourth. (3) The third hieroglyph in Kleopatra is a reed, which is *aké* in Coptic and *aak* in the old Egyptian, and represents the E of Kleopatra. The reed is doubled in Ptolemaios and occupies the sixth and seventh places, where it represents the diphthong *ai* of Ptolemaios. (4) The fourth hieroglyph in Kleopatra is a noose, which represents the O of both names and occurs in the third place of Ptolemaios. (5) The fifth hieroglyph in Kleopatra is a mat, which represents the P of both names, and is the initial of Ptolemaios. (6) The sixth hieroglyph in Kleopatra is an eagle, which is *akhoom* in Coptic, and represents the A, which is found twice in the name of Kleopatra. (7) The seventh hieroglyph in Kleopatra is a hand, which is *toot* in Coptic, and represents the T of Kleopatra, but does not occur in Ptolemaios, where it might be expected to occupy the second place. The second place of Ptolemaios is occupied by a semicircle, which is found at the end of feminine proper names, and is the Coptic feminine article T. The researches of Champollion satisfied him of the existence of homophones, or characters having the same phonetic value and which might be interchanged in writing proper names. (8) The eighth hieroglyph in Kleopatra is a mouth, which is *ro* in Coptic, and represents the R of Kleopatra. (9) The ninth hieroglyph in Kleopatra is the eagle, which is explained in No. 6 above. (10) The semicircle is the T of Ptolemaios, which with (11) the egg found at the end of proper names of women, is a feminine affix. In the name of Ptolemaios there is still the M and the S to account for. The fifth hieroglyph in the cartouche of Ptolemaios is a geometrical figure, consisting of three sides of (probably?) a parallelogram, but now called a hole, because the Coptic *mu* has that signification, and represents the M. The hook represents the S of the word Ptolemaios. Vowels were only regarded by the Egyptians as they were needed to avoid ambiguous writing. There are groups of hieroglyphs of which one element is an ideographic sign, to which a phonetic complement is added to indicate the pronunciation of the ideographic sign. The

words of a text could be written in hieroglyphs in three ways—(1) by phonetic hieroglyphs; (2) by ideographic hieroglyphs; and (3) by a combination of both. According to Ebers, in the perfected system of hieroglyphics the symbols for sounds and syllabl. are to be regarded as the foundation of the writing, while symbols for ideas are interspersed with them, partly to render the meaning more intelligible, and partly for ornamental purposes. Consult: Brugsch, 'Egyptologie' (1891); Erman, 'Life in Ancient Egypt' (1894); and 'Egyptian Grammar' (1894).

Hierosolyma. See **JERUSALEM.**

Hig'gins, Anthony, American politician: b. Red Lion Hundred, Del., 1 Oct. 1840; d. New York, 26 June 1912. He was educated at Yale, studied at Harvard Law School and was admitted to the Delaware bar in 1864. From 1869 to 1876 he was United States attorney for Delaware, and becoming interested in politics was chairman of the Republican State Convention in 1868. In 1881 he secured the vote of the Republican members of the Delaware legislature for the National Senate and in 1884 was defeated as a Republican candidate for Congress. He was United States Senator 1889-95.

Hig'gins, Ella Rhoads, American novelist and poet: b. Council Grove, Kan., 1862. She was married to R. C. Higginson and has passed her life mainly in the vicinity of Puget Sound, Wash. She has contributed much to periodicals, and her work, which has a distinctly original flavor, has attracted much attention from its vigorous presentation of life on the upper Pacific slope. Her most noteworthy book is 'Mariella, or Out West,' an extremely strong novel (1902); and other works of hers are 'The Flower that Grew in the Sand' (1896); 'From the Land of the Snow Pearls' (1897); 'A Forest Orchid' (1897); and several collections of poems.

Higginson, Francis, English clergyman in colonial America: b. 1587; d. Salem, Mass., 6 Aug. 1630. He was educated at Cambridge, England, and subsequently became rector of a parish in Leicester, but becoming gradually a Nonconformist, was deprived of his benefice, and was employed among his former parishioners as a lecturer. While apprehending a summons to appear before the high commission court, he received an invitation from the Massachusetts Company to proceed to their colony, which he accepted. He embarked in May 1620, and it is related by Cotton Mather that as the ship was passing Land's End, he called the passengers about him and exclaimed: "We will not say, as the Separatists were wont to say at their leaving of England, 'Farewell, Babylon; farewell, Rome!' but we will say, Farewell, dear England! farewell, the church of God in England, and all the Christian friends there. We do not go to New England as Separatists, though we cannot but separate from the corruptions of it. But we go to practise the positive part of church reformation, and propagate the gospel in America." He arrived at Salem 29 June, and on 20 July was chosen teacher of the congregation established there. Subsequently Higginson drew up "a confession of faith and church covenant according to Scripture," which on 6 August was assented to by 30 persons, who associated themselves as

a church. He wrote 'New England's Plantations, or a Short and True Description of the Commodities and Discommodities of the Country' (1630), and an account of his voyage, printed in Young's 'Chronicles of the First Planters' (1846). Consult: T. W. Higginson, 'Life of Francis Higginson' (1891).

Higginson, Francis John, American rear-admiral: b. Boston 19 July 1843. He was graduated from the United States Naval Academy in 1861 and served in the United States navy during the Civil War becoming lieutenant-commander in 1866. He was commander of the Massachusetts during the Spanish-American War 1898, was promoted commodore that same year, and rear-admiral in March 1899.

Higginson, Henry Lee, American banker: b. New York 18 Nov. 1834. He was educated at Harvard, studied music abroad and served in the Federal army during the Civil War and was brevetted lieutenant-colonel. He has been long connected with the Boston banking firm of Lee-Higginson & Co., and has contributed large amounts toward the organization and support of the Boston Symphony Orchestra.

Higginson, Mary Thacher, American author, wife of T. W. Higginson (q.v.): b. Machias, Maine, 27 Nov. 1843. She has written 'Seashore and Prairie' (1876); 'Room for One More' (1879); and 'Such as They Are' (1893), poems written in collaboration with her husband.

Higginson, Sarah Jane Hatfield, American writer: b. Philadelphia 15 Jan. 1840. With her first husband, a Dutch jurist, she lived for several years in the Dutch East Indies, and after his death returned to the United States, where she was married to Stephen Higginson, a former American consul in the Dutch East Indies. She has written: 'A Princess of Java: a Tale of the Far East' (1887); 'Java, the Pearl of the East,' a book of travel (1890); 'The Bedouin Girl.'

Higginson, Thomas Wentworth, American author: b. Cambridge, Mass., 22 Dec. 1823; d. there 10 May 1911. He was descended from Rev. Francis Higginson (q.v.); was graduated from Harvard in 1841, and from Harvard Divinity School in 1847. He became pastor of a Unitarian church in Newburyport, Mass., in 1847, but resigned in 1850, his anti-slavery views being unacceptable to his congregation. In the year last named he was the unsuccessful 'Free Soil' candidate for Congress, and he was pastor of a Free (unsectarian) church at Worcester, Mass., 1852-8. In the interim he had been prominent in anti-slavery agitation, and for his share in the attempted rescue of the fugitive slave Anthony Burns (q.v.), was indicted for murder in 1854 with Wendell Phillips, Theodore Parker and others, but owing to a flaw in the indictment the defendants were discharged. He also aided in the Kansas Free State efforts, and during the Civil War was captain of the 51st Massachusetts regiment of volunteers, becoming colonel in November 1862, of the 1st South Carolina volunteers, the earliest regiment of freed slaves in the Federal service. He resigned from the army in October 1864, by reason of disability, and thereafter gave his attention to literature, residing at Cambridge, Mass., since

HIGH CHURCH — HIGH FREQUENCY OSCILLATING CURRENT

1878. He was almost a life-long and consistent advocate of woman suffrage and of the higher education of woman, and was a member of the Massachusetts legislature 1880-1, serving on the State board of education also, 1881-3. He was a polished, graceful speaker, and frequently appeared on the lecture platform. He was the Lowell lecturer on American Literature in Boston in 1902. As an after-dinner or occasional speaker he was especially happy, his felicitous sentences being almost always illuminated by the play of a very delicate humor. He was president of the Round Table, a social Boston club, and vice-president of the Boston Authors Club, as well as a member of many other organizations, social and literary. He was for a generation a constant contributor to periodicals of the highest class and figured in literature as essayist, novelist, poet, and historian. His principal work in fiction is 'Malbone' (1869), in which his first wife is outlined as Aunt Jane. As an essayist he is perhaps seen at his best, the essay form seeming peculiarly adapted to his genius. Among collections of essays by him may be cited: 'Outdoor Papers' (1863); 'Atlantic Essays' (1871); 'Women and Men' (1887); 'The New World and the New Book' (1891); and 'Concerning All of Us' (1892). His 'Young Folks' History of the United States' (1875) has been widely popular, and other histories by him are 'Larger History of the United States' (1885); 'English History for Americans' (1893); 'Massachusetts in the Army and Navy, 1861-5' (1895-6). His verse is included in 'The Afternoon Landscape' (1889); 'Such as They Are' (1893). Yet other important works by him are 'The Monarch of Dreams,' a strikingly original sketch (1886); 'Army Life in a Black Regiment' (1869); 'Cheerful Yesterdays' (1898); 'Old Cambridge' (1899); 'Contemporaries' (1899); and lives of Margaret Fuller (1884); Francis Higginson (1891); Henry W. Longfellow (1903); John Greenleaf Whittier (1903); 'History of the United States' (1905). He translated the complete works of Epictetus (1865, revised edition 1891). With Samuel Longfellow (q.v.) he completed a well-known anthology of seaside verse, 'Thalatta' (1853), and with Mrs. E. H. Bigelow 'American Sonnets' (1890). Several of his works have been translated into French, German, Italian, and even modern Greek. He was the friend of very many of the older New England writers and was especially helpful to many of the younger ones, not a few of whom owe him much in the way of kindly criticism or suggestion, the fruit of ripe scholarship.

High Church, a term applied to a faction in the Church of England. It was applied first to the younger clergy during the latter part of the reign of Elizabeth who asserted that Calvinism was inconsistent with the ancient doctrine and constitution of the primitive church, and who claimed a divine right for episcopacy. Bishop Andrews was the chief writer of this faction, and Laud became its most active leader. The term now generally refers to those who exalt the authority and jurisdiction of the church, and attach great value to ecclesiastical dignities and ordinances, being more or less

identified with the ritualistic party. See **RITUALISM**.

High Bridge, Engagement at. See **FARMVILLE**.

High-Frequency Oscillating Current.

This term is especially applicable to electrical currents, the high frequency interruptions of which are obtained by means of condenser discharges in contradistinction to those produced by a disrupted static current, without the interposition of a metallic condenser in series with one or both terminals. The latter differs in several characteristics and is essentially a high potential current, 10,000 to 50,000 volts, with a minimum amperage, usually about .0005.

To generate a high-frequency current it is usual to charge two Leyden jar condensers with a high potential current, the source of which may be a static machine or induction coil, shunting the two wires with a spark-gap for the purpose of disrupting the current. The external armatures of the condensers are short-circuited through a solenoid or helix consisting of a few turns of coarse copper wire (D'Arsonval). The helix may be substituted by a straight copper bar (Sheldon). By prolonging the helix from 50 to 100 turns, this constitutes the resonator of Oudin. The upper part of the helix resonates in unison with the lower, when properly in tune, as would a tuning-fork resonate with another of the same pitch. The office of the extended helix is to amplify the current.

Another arrangement is after Tesla: The primary of a specially constructed induction coil is energized by an alternating current. The secondary terminals, giving a potential of 15,000 volts, are connected, one to each side of a suitable condenser. From each of these terminals a shunt is taken. One leads to one end of the primary of a Tesla coil; the other, broken by a spark-gap, is connected to the second terminal of the primary. The frequency obtained from the Tesla apparatus is fabulously high—millions a second. The potential may be hundreds of thousands or millions of volts. The amperage is sufficient to light to full candle-power several incandescent lamps. The primary of the induction coil consumes 15 to 25 amperes. For maximum high frequency effects this type of apparatus seems to be essential. The brush discharge from the terminals may be 20 or even 50 inches in length. There are many modifications of this apparatus.

The one characteristic of the high-frequency oscillating current is its lack of power to excite the motor, and, aside from a slight sensation of warmth, the sensory nerves at the point where the electrode touches the body. The accepted explanation for this fact is, that the nerves respond to certain frequencies of stimulus; for the motor nerves, reaction takes place up to about 5,000 frequencies; if these are gradually increased muscular contraction diminishes and finally ceases. This theory is in line with reasoning as to the cause for action of the special senses—sight and hearing.

At the terminals of a working high-frequency apparatus is seen a beautiful brush discharge or effluve of a peculiar blue color, which will leap to any object brought near it. Interpose a plate glass one half inch thick (or more), and

HIGH PRIEST — HIGH TREASON

the effluve will penetrate it. If the object be a vacuum tube it will glow almost as brightly as if nothing intervened. It is an ideal current for igniting Geissler and low-vacuum X-ray tubes; only one terminal need be connected.

The high-frequency discharge is a rich ozone generator, and, applied to unhealthy granulations and various skin diseases, acts as an oxidizer, antiseptic, and disinfectant. Applied to the skin before incision, it will render the site aseptic.

For general effect the patient is placed upon an auto-condensation couch or in the centre of an auto-conduction cage. In the treatment of sub-acute and chronic rheumatism, sciatica, neurasthenia, etc., it is most useful.

JOHN M. GARRATT, M.D.

High Priest, the head of the Jewish priesthood. In the books of Moses the holder of this dignity is simply designated the priest, the epithet high occurs on one or two occasions, but as a distinctive epithet it appears to have been added subsequently. The formal consecration of Aaron, the brother of Moses, together with his sons, to a hereditary priesthood, is recorded in Ex. xxviii. The high-priesthood continued in the line of Aaron, sometimes in one, and sometimes in another branch of it, until the coming of Christ. After the subjugation of the Jews by the Seleucidæ, the Ptolemies, and the Romans, it was often arbitrarily conferred by the foreign masters. The dignity of the priest's office is indicated by the splendor and costliness of his garment, which was among the most beautiful works of ancient art. To the high priest belonged the regulation and superintendence of the worship of God, the declaration of the oracles of Jehovah to the people (he alone being permitted to consult them on important public occasions), and the preservation of the national sanctuary. Although the administration of justice was committed to particular judges, yet to him the last appeal was made in difficult cases, even in temporal affairs, and nothing important in war or peace could be undertaken without his assent.

High Schools, the term applied in the public school system of the United States to the institutions for secondary and higher education preparatory to a college course. They were generally established at public expense between 1820 and 1850, to correspond in grade to the academies or schools maintained by endowment or at private expense in which young men were prepared for college.

The European representatives of the American high schools are the public schools and colleges of Great Britain, the lycæums of France, Spain, and Italy, and the gymnasia of Germany; the universities in Germany are officially called high schools (*Hochschulen*).

The term "high school" was applied as early as the 16th century to a celebrated educational establishment of a liberal character, a grade below the university, in Edinburgh, Scotland.

In 1647 the Massachusetts Colony enacted a law that every town of 100 families should maintain a school, the teacher of which should be "able to instruct youth, so far as they may be fitted, for the university." This law, though imperfectly obeyed, introduced very early into Massachusetts and New England a small num-

ber of classical schools, and subsequently prepared the way for the endowment of a few academies in which young men were prepared for the colleges. Of these especially endowed academies, many of which rendered eminent service, the more notable are the Hopkins Grammar Schools of Hartford and New Haven, Conn.; the Hopkins Academy in Hadley, and Phillips Academy at Andover, Mass.; Phillips Exeter Academy at Exeter, N. H., and Amherst Academy, Mass. Among the public schools of the country, the Boston Latin School, a colonial foundation, was for a long time almost the only classical school supported by public taxation at which students could be prepared for college. It was pre-eminent alike for the thoroughness of the education which it gave, and the freeness with which this was proffered to all the residents of Boston. In 1821 the English High School, supplementary to the Latin School, was established in Boston. In Philadelphia the corresponding institution still bears the name of the Central High School, while in New York city the original Free Academy has developed into the College of the City of New York. With the reorganization of the public school systems of the older States, and the foundation of such systems almost simultaneously with the redemption of the soil from the forest and wild prairie in the newer States, provision was made for a system of high schools, to give a thorough preparation for the college curriculum. These high schools are now in vigorous operation from one end of the United States to the other. See EDUCATION, SECONDARY.

High Seas. Among maritime nations both in ancient and modern times the necessity for some international regulations to govern their communications by sea has been found a necessity. The views of jurists on this subject have fluctuated between two opposite principles. Nations possessing a powerful marine, are disposed to push their privileges to the utmost, and to claim exclusive accession to, or a superiority and protective rights over, extensive tracts of the ocean highway. The weaker maritime nations, on the other hand, and the commercial rivals of these most especially privileged, have contended for the liberty of the seas. The most memorable instance of this controversy occurred in connection with the claims arising out of the great maritime discoveries of the Portuguese at the close of the 15th century. Under the grant of Pope Alexander VI. the Portuguese claimed the right to exclude other nations from the seas between the eastern coast of Africa and the coasts of India. Against this claim Grotius wrote his celebrated treatise, the '*Mare Liberum*,' which appeared in 1609. The English, who had their own claims of jurisdiction, were not then, or for long after, prepared to admit the liberty of the seas. The general principle of international law now accepted is that the jurisdiction of maritime nations extends only for three miles, or within cannon range of their own coasts; the remainder of the seas being high seas, accessible on equal terms to all nations. Inland seas and estuaries, of course, are excepted.

High Treason (*Fr. trahison*, betrayal), is defined in English law as the most heinous of all offenses against the law, and consists in imagin-

HIGHBINDERS—HIGHER CRITICISM

ing or devising the death of the ruling monarch, or proposing to kill, maim or restrain the king or queen; or levying war against him; adhering to his enemies; killing his wife or eldest son, or heir; violating his wife, or daughter, or heir's wife; killing the lord chancellor; killing the chancellor of the exchequer, or a justice in office. High treason against the United States consists in levying war against them; adhering to their enemies, or giving their enemies aid and comfort. Treason against a State is generally defined as hostility to a State only. The former punishment of treason in English law was death by hanging, drawing and quartering. The penalty is now hanging or imprisonment. This crime is punishable in the United States according to the act of 1862 by death or imprisonment with hard labor for a period of not less than five years, a fine of not less than \$10,000 and a perpetual disability to hold any office under the United States. The act of 1862 adds: "No person shall be convicted of treason unless on the testimony of two persons to some overt act, or on confession in open court. The Congress shall have power to declare the punishment of treason, but no attainder of treason shall work corruption of blood (q.v.) or forfeiture except during the life of the person attainted."

Highbinders, a name given to a secret organization among the Chinese in the United States which has caused much bloodshed in the Chinese quarter of San Francisco, Cal., necessitating intervention on the part of the authorities. The Chinese call these societies "hatchet" societies, and the members "hatchet men." The organization seems to be an offshoot of the Six Companies (q.v.), though some claim that it is merely a revival of one which originated over 200 years ago in China.

Higher Criticism, The. The higher criticism is a science whose aim is the determination of the literary history of books and writings. It sets forth the facts and principles by which we must determine, in the case of any writing, its literary form, its unity, its date, the place of its composition, its authorship, the method of its composition or construction, its integrity, and the amount and character of any subsequent editing it has received, so far as these matters can be discovered by the use of such internal evidence as is presented in the writing itself. It is thus the science for ascertaining the literary form and the literary history of any writing by means of internal evidence. These same matters may also be determined, in part or in whole, by external evidence in many cases; that is, by history or tradition. This latter method will not necessarily be either better or worse than the method which employs internal evidence. The greater probability of the result, in every case, will depend upon the amount and the character of the evidence which is attainable. Sometimes external evidence may be more abundant and trustworthy than the internal evidence, and sometimes the reverse may be true.

The science under consideration is termed higher criticism to distinguish it from the related science of lower, or textual, criticism. This latter science has for its object the ascertaining of the history of writings as the work of penmen and printers. It seeks to determine

just the words and the letters which the author himself wrote, and what are the changes which his work has suffered in transmission. Since the literary history of a writing is, on the whole, of more importance than the history of the written or printed text, the science of the literary history is justly termed the higher criticism.

The higher criticism is a science which is equally applicable to all literatures. It may be used to determine the literary history of a writing of any age, language, or people. But, of late, it has been especially brought into notice in its application to the literature of the Bible. On this account, it is sometimes spoken of as if it were a science belonging to Biblical study only. But the fact is that Biblical higher criticism is only one department of higher criticism in general.

As employed in Biblical study, higher criticism adopts the following method: (1) it sets forth the principles by which, according to the teachings of general literary criticism, we may correctly determine the literary form, the unity, the date, the place of composition, the authorship, the method of composition or construction, the integrity, the amount and character of subsequent editing, of each of the Biblical books and writings; (2) it then presents the evidential facts to be found in each of the Biblical books and writings, to which these principles will apply; and (3) finally it gives the conclusions which result from the application of these principles to the evidential facts. In practice, however, different schools of Biblical higher critics come to very different conclusions upon the same basis of evidential facts, while using the same principles of criticism. This results from the varying opinions held by these critics in relation to the value and significance of the evidential facts, due to their differing views about the history of Israel, and their philosophical convictions concerning the place of the supernatural in that history. Those critics who refuse to allow the existence of any supernatural element in the history of Israel, and hold that this history was the product of only those forces which shape and determine all human history, so that it was exactly like the history of every other people, cannot put the same value and meaning upon the historical testimony and references to be found in the Biblical books, as those critics must who believe that the history of Israel was, to no inconsiderable extent, a supernatural history, and, therefore, different from the history of every other people. In the case of the Old Testament, for example, some critics hold, because of their philosophical opinions in regard to the supernatural, and the universality of the working of the evolutionary forces of history, that the historical material of the Old Testament, as we now have it, is not to be accepted as the true basis of Old Testament history, and that this history must be constructed out of this material, under the guidance of some philosophical theory. Other critics accept the historical material which is now to be found in the Old Testament, as furnishing in itself the true Old Testament history. Since the evidential facts used in higher criticism receive their value and meaning from their evident relation to a previously determined history, it is clear

that each of two so different histories cannot be a basis for the same critical conclusions. But it is to be noted that the determination of the histories is not a work of higher criticism, but is a matter which results from the philosophical opinions held by historians. The consequence of these facts is that the only results which have thus far been reached by Biblical higher criticism, which all schools of critics would accept, seem to be: (1) The existence of different documents in the Pentateuch, which have been used in its compilation, although there is, among critics, quite a little difference of view in relation to the age of these documents and the time of their compilation into the Pentateuch; (2) the plural authorship of the books of the Old Testament known as the books of Isaiah and Zechariah; and (3) the fact that older sources have been used in the making of the synoptic gospels and the book of Acts. From all that has been said, it will be seen that it is not the duty of higher criticism to assert or deny anything in relation to the inspiration of the Scriptures, or their authority for belief or conduct. With these matters this science has absolutely nothing to do.

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Higher Law, a famous phrase used by William H. Seward (q.v.) 11 March 1850, in the United States Senate, on the admission of California as a State, which was held up by the Southern element to force the Congress to admit it as a slave State, or at least to divide it on the line of the Missouri Compromise (q.v.). Seward denied that the principle of compromise applied only to slavery, which was only one of many institutions, and held it equally applicable to the Territories, which were a possession to be enjoyed and administered in common by the States; and declared that the older States had no arbitrary power over them. He went on: "The Constitution regulates our stewardship; the Constitution devotes the domain to union, to justice, to defense, to welfare, to liberty. But there is a higher law than the Constitution, which regulates our authority over the domain, and devotes it to the same noble purposes. The territory is a part . . . of the common heritage of mankind, bestowed upon them by the Creator of the universe. We are his stewards, and must so discharge our trust as to secure in the highest attainable degree their happiness." And to Webster's assertion that it was absurd to re-enact the laws of God, he answered that "there is no human enactment which is just that is not a re-enactment of the law of God." It was his first set speech in the Senate, and at once made him the recognized leader of the radical section. The conservatives denounced it as treasonable, implying that no one was under any obligation to support the Constitution if he believed it in opposition to

the law of God, and making the execution of any laws impossible.

Higher Plane Curves. See CURVES, HIGHER PLANE.

Highland Cattle, a variety of small, rough-coated, usually red or black cattle, with upturned horns, kept half wild upon the moors of the Scottish Highlands, and believed to represent in part the cattle of the aboriginal Britons, which are replaced in the south of Great Britain by the short-horned breeds introduced by the Roman conquest. Compare WHITE CATTLE.

Highlanders, Scotch, in the United States. After the Jacobite risings in England in 1715 and 1745, in favor of the Old and Young Pretenders, which were zealously supported by the Highlanders (who indeed formed their backbone), the English government exerted itself to drain their strength by colonizing them elsewhere; and many who were in danger of vengeance came to America voluntarily. The chief movement was after 1745, when the government thoroughly reorganized the Highlands, broke up the clans, and deported large numbers to the colonies; but after 1715 many, in bands or as individuals, had come over, especially to the Carolinas. Some settled in western South Carolina, as farmers or Indian traders; a considerable body near Fayetteville, N. C., where their descendants still speak Gaelic in preference to English, and have their church ministrations in that language; and a number of different colonies in the future Georgia, where Oglethorpe found them when he came over in 1733 with a patent for a new colony. Especially he won the hearts of a settlement at Darien, under a Capt. Mackay. These Highlanders gave him priceless help in his incessant fights with the Spaniards and constant negotiations with the Indians; but they strongly opposed the slave trade or the introduction of slaves into Georgia. Some Highland companies sent to the Mohawk Valley, during the French and Indian war, were disbanded there, and remained as settlers, a recognizable element during the Indian troubles of the early Revolution.

Hil'da, Saint, Anglo-Saxon abbess: b. about 614; d. 680. She was consecrated as a nun by Bishop Aidan, and was successively head of the abbey of Hartlepool, and of the famous monastery founded by her in 657 at Whitby, Yorkshire. This continued for several centuries a religious house of great power and influence. In the time of its founder perhaps the strongest in Great Britain. Cædmon (q.v.), the Anglo-Saxon poet, was attached to the monastery during her rule, and it was there that the celebrated synod took place in 664 in which the Celtic ritual was condemned. Consult: Bede, 'Ecclesiastical History.'

Hil'debrand. See GREGORY VII., POPE.

Hil'dreth, Richard, American historian: b. Deerfield, Mass., 22 June 1807; d. Florence, Italy, 11 July 1865. He was graduated at Harvard in 1826, studied law at Newburyport, entered practice in Boston, and abandoned it in 1832 to become editor of the 'Boston Atlas.' In this position a series of articles by him in 1837, relative to the separation of Texas from Mexico, did much to stimulate the resistance which that movement encountered in the free

States. In 1834 his anti-slavery novel, 'The Slave,' was written. This work was republished and favorably received in England, and in 1852 an enlarged American edition appeared under the title of 'The White Slave: Memoir of Archy Moore' (1837). In 1837-8 he was Washington correspondent of the 'Boston Atlas,' and resumed his editorial post as an advocate of the election of General Harrison, of whom he wrote a campaign biography. He then abandoned journalism, and in 1840 published, under the title of 'Despotism in America,' a volume on the political, economical, and social aspects of slavery, to which in the edition of 1854 was appended a chapter on the 'Legal Basis of Slavery.' In 1840-3 he resided in Demerara, British Guiana, and at Georgetown edited two free labor newspapers. Later, for several years, he was a member of the New York *Tribune* staff, and in 1861 was appointed United States consul at Trieste. His best known work is his 'History of the United States' (1849-56), which extends from 1492 to the end of President Monroe's first term. The author sought an authentic presentation of the conspicuous figures of earlier American history. His work is accurate and careful, though with a Federalistic viewpoint; but so uninteresting in manner as to be ill-adapted for continuous reading. Hildreth also wrote: 'Theory of Morals' (1844); 'Theory of Politics' (1853); 'Japan as it Was and Is' (1855); and 'Atrocious Judges' (1856).

Hilgard, bil'gård, Eugene Woldemar, German-American chemist and geologist: b. Zweibrücken, Bavaria, 5 Jan. 1833. He came to the United States in 1836, returned to Europe for purposes of study and was graduated (Ph.D.) at Heidelberg, 1853. In 1858 he became State geologist of Mississippi, in 1873 was appointed professor of geology and natural history in the University of Michigan, and in 1875 was made professor of agricultural chemistry and director of the agricultural experiment station in the University of California. He received the Liebig medal from the Munich Academy of Sciences in 1894, and his investigations into the chemistry and physics of soils have done much to promote agricultural science.

Hill, Adams Sherman, American educator: b. Boston, 30 June 1833. He was graduated from Harvard College 1853 and Harvard Law School 1855, and in 1875 became Boylston professor of rhetoric and oratory at Harvard University. He has written: 'Principles of Rhetoric' (1878); 'Our English' (1889); 'Foundation of Rhetoric' (1892).

Hill, Ambrose Powell, American military officer: b. Culpeper County, Va., 9 Nov. 1825; d. 2 April 1865. He was graduated at the United States Military Academy 1847; served in the Mexican War, but resigned from the army in March 1861, and was made colonel of the 13th Virginia regiment of the Confederate army. Having distinguished himself in service, he was promoted major-general in May 1862, and lieutenant-general 20 May 1863, and placed in command of one of the three corps of the army of Northern Virginia. He led his corps at Gettysburg and later at Bristow Station and the assault on the Weldon railroad in

1864. He was killed in the attack on Petersburg, Va.

Hill, Benjamin Harvey, American legislator: b. Jasper County, Ga., 14 Sept. 1823; d. 16 Aug. 1882. He was graduated at the State University of Georgia in 1844 and chose law as a career. In 1851 he was elected to the State legislature. He in vain attempted to withstand the secession sentiment of his State, but at last yielded to the movement, and was elected to the Provisional Confederate Congress, and from the assembly promoted to the Confederate Senate. He supported Greeley for the presidency in 1872, and was defeated for the United States Senate the following year, but after being elected to the House of Representatives in 1875, was given a seat in the United States Senate 1876 and held it for the remainder of his life.

Hill, Daniel Harvey, American military officer: b. Hill's Iron Works, York district, S. C., 12 July 1821; d. Charlotte, N. C., 24 Sept. 1889. He was graduated at the United States Military Academy in 1842, and served in the Mexican War; became professor of mathematics and military tactics in Washington College, Va., in 1849, professor of mathematics in Davidson College, N. C., in 1854; and was made president of the North Carolina Military Institute in Charlotte in 1859. At the outbreak of the Civil War he entered the Confederate army as colonel; was promoted to lieutenant-general in 1863, and commanded a corps at the battle of Chickamauga. After the close of the war he resumed his educational work, and in 1877 became president of the Arkansas Industrial University, where he remained until shortly before his death.

Hill, David Bennett, American lawyer and politician: b. Havana, N. Y., 29 Aug. 1843; d. 20 Oct. 1910. He entered a law office in Elmira, N. Y., in 1862, and after admission to the bar in 1864, rapidly built up a law practice and was an acknowledged leader of the local bar. He was active in politics, and acquired a leadership there also, through his genius for organization. He was a member of the State assembly 1870-1, and president of the Democratic State convention in 1877 and 1881. In 1882 he was elected mayor of Elmira, and lieutenant-governor in the same year, with Cleveland as governor. In 1885, when Cleveland resigned to take up his duties as President, Hill became governor. He was subsequently twice elected governor, serving till January 1892, when he took his seat in the United States Senate. During his first administration as governor, the legislature was Republican, and he was involved in a number of partisan struggles. As senator, he opposed on some issues the policy of President Cleveland; he was also opposed to the income tax clause of the Wilson Tariff Bill. In 1892 he was a prominent candidate for the presidency at the Democratic National convention, and at the convention of 1896 was one of the chief leaders of those who favored the gold standard and were opposed to radicalism in the party. In 1894 he was again candidate for governor of New York State, but was defeated by Levi P. Morton. In 1902 he practically dominated the Democratic State convention, and was active throughout the campaign.

Hill, David Jayne, American educator and diplomat: b. Plainfield, N. J., 10 June 1850. He was educated at Buell University, where he became professor of rhetoric 1877-9, and president 1879-88. He was president of Rochester University, N. Y., 1888-96, resigning to spend three years in Europe studying international law and diplomacy. He was first assistant secretary of state 1898-1903; minister to Switzerland 1903-5, to the Netherlands 1905-8 and from 1908-11 to Germany. He has written biographies of 'Washington Irving' (1879); 'William Cullen Bryant' (1879); and Hugo Grotius (1902); 'Principles and Fallacies of Socialism' (1885); 'International Justice'; 'A Premier of Finance'; 'A History of Diplomacy in the International Development of Europe' (1905).

Hill, Frank Alpine, American educator: b. Biddeford, Maine, 12 Oct. 1841; d. Brookline, Mass., 12 Sept. 1903. He had long been prominent among New England educators, and after being head-master of high schools in Milford, Chelsea, and Cambridge, Mass., became secretary of the Massachusetts State Board of Education in 1894. He was a trustee of the Massachusetts Institute of Technology, of the State Agricultural College at Amherst, and of the Boston Museum of Fine Arts, as well as a commissioner of the State School Fund.

Hill, Frank Pierce, American librarian: b. Concord, N. H., 22 Aug. 1855. He was graduated from Dartmouth in 1876. In 1881 he became librarian of the Lowell public library, and in 1885 he organized the first free public library in New Jersey at Paterson. He also organized the Salem public library, and the Newark library in 1889. At Newark a new building was erected under his administration and the library brought to a high degree of efficiency so that it is recognized as one of the model public libraries. In 1901 he was appointed chief librarian of Brooklyn, under the new system established upon the receipt of Mr. Carnegie's gift.

Hill, Frederic Stanhope, American sailor and author: b. Boston, 24 Aug. 1829. He went to sea when a boy, and during the Civil War was an officer in the United States navy. He was with Farragut at the capture of New Orleans and Vicksburg, and was also in command on the Texas coast and in the Mississippi squadron. He has written: 'Twenty Years at Sea' (1896); 'Story of the Lucky Little Enterprise'; 'Twenty-six Historic Ships' (1903); and has been editor of the Cambridge 'Tribune.'

Hill, George Birbeck, English educator and author: b. Tottenham, Middlesex, 7 June 1835; d. Hampstead, London, 24 Feb. 1903. He was a nephew of Sir Rowland Hill (q.v.), was educated at Oxford, and was head-master of Bruce Castle School 1859-76. Since the latter date he had devoted his attention to literature and was well known in the United States through his 'Harvard College, by an Oxonian' (1894). Other works by him are: 'Talks about Autographs' (1896); 'Dr. Johnson: his Friends and his Critics' (1878); 'Life of Sir Rowland Hill' (1880); 'Foot-steps of Dr. Johnson in Scotland' (1890); 'Memoirs of the Life of Edward Gibbon' (1900).

Hill, Henry Wayland, American lawyer: b. Isle La Motte, Vt., 13 Nov. 1853. He was

graduated from the University of Vermont in 1876, was principal of Swanton, Vt., union school 1877-9, and of Chateaugay, N. Y., academy 1879-83. He was admitted to the bar at Albany, N. Y., in 1884, and entered upon the practice of his profession at Buffalo. He was a member of the New York assembly 1896-1900, and has been State senator since 1901, representing each time a constituency in Buffalo. He is the author of several constitutional provisions and of several general statutes now in force. During his public career he has secured for Buffalo large State appropriations for the new 74th and 65th regiment armories, for the Historical Society building, for harbor improvement and other public purposes. He also advocated measures designed to provide home rule for cities, reform in election methods, etc., and many important State measures, such as the Primary Election law, the Civil Service law, the Franchise Tax law, the Pharmacy law, and the Canal Improvement referendum of 1903. He has made a study of waterways in this and other countries, and contributes the article on that subject in this encyclopedia. He is the author of 'The Development of Constitution Law in New York,' and a contributor to the 'Bibliophile Edition of the Odes and Epodes of Horace.'

Hill, James J., American capitalist: b. near Guelph, Ont., 16 Sept. 1838. At 18 in the village of St. Paul, Minn., he became check-clerk and caretaker of freight at the steamboat landing. At that time there was not a mile of railroad in the State. In 1862 the first 10 miles of railroad were finished from the levee in St. Paul to the riverside in St. Anthony, and known as the St. Paul and Pacific railroad, of which Hill later became the agent. After the Civil War, Hill clearly discerned the great resources and possibilities of the Red River country—Western Minnesota and Eastern Dakota. He went East, contracted for his boilers and machinery, and on the bank of the river built a flat-bottomed steamer called *The Selkirk*, which in the summer of 1870 began to run between Winnipeg and the head of navigation, to rival the line operated by the Hudson Bay Company. The same year, 1872, Hill consolidated his transportation interests with those of the Hudson Bay Company, forming the Red River Transportation Company. The St. Paul and Pacific railroad now reached the western boundary of the State at Breckenridge. For several years the St. Paul and Pacific system of railroads, consisting of 437 miles of completed track, was in poor condition. The stockholders, mostly Holland capitalists, were weary with delay and misfortune. Because of his faith in the future of the region Hill formed a syndicate of five persons which soon gained possession of the road, and in June 1879, the system was consolidated into a single ownership as the St. Paul, Minneapolis and Manitoba Railroad Company. In 1880 the road was extended to the Pacific coast, traversing vast tracts of land without human habitation. The track was well laid, but the stations were often only freight cars, remote from one another, and from other human settlements. The road is now known as the Great Northern. Coal fields were discovered, a branch road carried their product for the use

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of the main line and settlements formed for preparing the lumber for shipment. To ship valuable lumber eastward was an excellent plan; but to send empty cars after it was out of the question; and Hill conceived the idea of shipping grain for the Japanese steamers to carry to the Orient. An agent was sent to China and Japan to find out what the price of wheat must be to compete with rice, and the result was that the Japanese Navigation Company, the third largest steamship company in the world, began to carry large shipments of grain to China and Japan. Large docks for these steamers were built at Seattle, Wash., the western terminus of the road. The original 437 miles of completed road of which Hill took charge as manager, developed into the Great Northern system of 6,000 miles. In 1883 he became president of the company. The road extends from Puget Sound to St. Paul, or during the season of navigation to Duluth and Superior, where it connects for Buffalo with its own steamers. A fleet of six freight vessels are added to these. The grain ships moving through the "Soo" give that canal rank over the Suez in point of tonnage.

In developing this scheme the plan increased enormously in the process. Besides laying the foundation of a great fortune, it opened a very rich and vast new country, reached out to new markets for many American products, and brought benefit to great numbers of people. All along the line of the road Hill encouraged the most diversified and productive farming, and introduced new methods and labor-saving devices.

Hill, Octavia, English social reformer: b. about 1838. She began work among the London poor under F. D. Maurice (q.v.); and in 1864, supported by Ruskin, began her great work of improving the homes of workingmen in the slums of London. Her methods were based upon the principle of teaching the people to help themselves, by inculcating in them right notions of cleanliness, order, and self-respect. Her efforts have been crowned with great success; the houses which have been improved yield a good percentage on the money spent in effecting the improvements; and through her hundreds have been helped to lead more comfortable and better lives. She has written 'Homes of the London Poor' (1875); 'Our Common Land and other Essays' (1878).

Hill, Robert Thomas, American geologist: b. Nashville, Tenn., 11 Aug. 1858. He was graduated from Cornell University in 1886; and was immediately given a position on the United States Geological survey. He was also a lecturer in the school of economics at the University of Michigan, and professor of geology at the University of Texas for two years, which position he resigned to return to the United States Geological Survey. He has been engaged in geological and geographical explorations in the southwestern States, Mexico, Central America, and the West Indies. His work in the two last-mentioned localities has been the investigation of the origin of the land forms, and the problem of the union of the continents. Among his most valuable contributions to geological science have been the proof of the existence of the lower cretaceous formation in the United States and the announcement of the possibility of artesian wells in Texas. In May 1902 he

was sent by the National Geographical Society at the head of the expedition to investigate the volcanic eruption of Mount Pelée in Martinique. His publications include 'On Occurrence of Artesian and Other Underground Waters in Texas' (1892); 'Cuba and Porto Rico with other Islands of the West Indies' (1898); and numerous contributions to the bulletins of the geological survey and periodicals.

Hill, Rowland, English popular preacher: b. Hawkstone, Shropshire, 13 Aug. 1744; d. London 11 April 1833. He was ordained in the Anglican Church, but embracing the views of the Calvinistic Methodists, soon began to preach in barns and meeting-houses, and when they were too small or too distant, or not to be procured, in streets, fields, and highways. In 1783 he laid the foundation of Surrey Chapel, Blackfriars Road, London, where he preached with great success every winter for about 50 years, making summer excursions to the provinces, where his eloquent but eccentric preaching attracted immense crowds. He published sermons and other theological works, of which the best known are his 'Village Dialogues.'

Hill, Rowland, Viscount, English soldier: nephew of Rev. Rowland Hill (q.v.); b. Prees, Shropshire, 11 Aug. 1772; d. near Shrewsbury, England, 10 Dec. 1842. He entered the army in 1790 and served with distinction from Toulon to Waterloo. In 1812 he was made a K. B., and in 1814, a peer by the title of Baron of Almaraz and of Hawkstone. At the battle of Waterloo, Lord Hill commanded the right wing of the British. In 1828 he was appointed general commanding-in-chief of the British army. This important office he continued to hold under several successive ministries, and only resigned it a few months before his death. He was made a viscount in 1842. He was often styled 'the right arm of Wellington.' See Sidney's 'Life of Lord Hill' (1845).

Hill, Sir Rowland, English postal reformer: b. Kidderminster, 3 Dec. 1795; d. 27 Aug. 1879. He was engaged as a schoolmaster till 1833, shortly after which he was appointed secretary to the commissioners for the colonization of South Australia. In 1837 he published a pamphlet recommending the adoption of a low and uniform rate of postage throughout Great Britain and Ireland. The scheme was approved by a committee of the House of Commons, and early in 1840 the penny postage system, which seems to have been originally proposed by James Chalmers of Dundee, was carried into effect with the assistance of Rowland Hill, who, for this purpose, received an appointment in the Treasury. In 1846 he received a public testimonial of the value of upward of £13,000. In 1846, he was made secretary to the postmaster-general, and in 1854 chief secretary to the Post-office. In 1860 he became K. C. B.

Hill, Thomas, American Unitarian clergyman and mathematician: b. New Brunswick, N. J., 7 Jan. 1818; d. Waltham, Mass., 21 Nov. 1891. Left an orphan at 10 years; at 12 he was apprenticed to the printer of the 'Fredonian' newspaper, where he remained four years. He then entered an apothecary's shop, after a year's attendance at school, and served in it several years. He was graduated from Harvard College in 1843; and from the Divinity School in 1845,

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and was settled as pastor at Waltham the same year. He was president of Antioch College, Ohio, 1859-62. He accompanied Agassiz on his expedition to South America and was pastor of the Unitarian Church at Portland, Maine, 1873-91. He published 'Elementary Treatise on Arithmetic' (1845); 'Geometry and Faith' (1849); 'First Lessons in Geometry' (1855); 'Treatise on Curves' (1855); 'The Natural Sources of Theology' (1875); 'In the Woods and Elsewhere', verse (1888); etc.

Hill, Thomas, American painter: b. Birmingham, England, 11 Sept. 1829. He came to the United States in 1841. Returning to Europe he studied under Paul Mayerheim for several months, but is practically a self-taught artist. He painted the 'Yosemite Valley' which was chromo-lithographed by Prang. He has continued to confine himself to the grander aspects of American scenery, and notable among his productions are 'The Home of the Eagle'; and 'Grand Cañon of the Sierras.'

Hill, Walter Barnard, American lawyer and educator: b. Talbotton, Ga., 9 Sept. 1851; d. Athens, Ga., 28 Dec. 1905. He was graduated from the University of Georgia in 1870, and from the law school in 1871, with the degree of A.M. He was admitted to the bar, and practised law in Macon, Ga., from 1871 to 1899. He was a member of the Georgia Bar Association, and was its president in 1888; a member also of the American Bar Association and the chairman of the committee on judicial administration. He also was actively interested in educational progress, being trustee of Vanderbilt University at Nashville, Tenn. In 1899 he was appointed chancellor of the University of Georgia; as an educator he strongly approved the work of the Tuskegee and similar institutions for the negro. He wrote articles on legal and educational subjects and compiled the law code of Georgia (1873, 1882).

Hill, Walter Henry, American Roman Catholic priest and educator: b. near Lebanon, Ky., 21 Jan. 1822. He was graduated from St. Mary's College in 1843, was tutor there for a time, and also studied medicine at St. Louis University. In 1847 he became a member of the Jesuit order, taught at St. Joseph's College and at St. Louis University and completed his theological studies. In 1861 he was ordained a priest; in 1865-9 he was president of St. Xavier College at Cincinnati; he was socius of the provincial at St. Louis University in 1869 and professor of mental and moral philosophy there in 1871. From 1884 to 1896 he was pastor of the church of the Sacred Heart in Chicago, and in 1896 retired from all active duties. He has written 'Elements of Philosophy, comprising Logic and Ontology' (1873); 'Ethics of Moral Philosophy' (1877); 'Historical Sketch of St. Louis University' (1879); and valuable contributions to the 'American Catholic Quarterly.'

Hill River. See HAYES RIVER.

Hillard, hil'ard, George Stillman, American author and lawyer: b. Machias, Maine, 22 Sept. 1808; d. Boston 21 Jan. 1879. He was graduated from Harvard in 1828, and from the Harvard Law School four years later. He was a member of the Massachusetts senate in 1850, where his policy as a legislator was warmly commended by Daniel Webster; a member of

the Massachusetts constitutional convention in 1853; and United States district attorney in 1866-70. Though successful as a lawyer his tastes were largely literary; he was well known as a lecturer; was editor of the 'Christian Register' with George Ripley, and associate editor of the Boston *Courier*; wrote 'Six Months in Italy' (1853); 'Life of George Ticknor' (with Mrs. Ticknor); 'Life of George B. McClellan' (1864), and edited a series of school readers which bore his name, and the works of Spenser.

Hillebrand, Karl, kār'l hī'l'lē-brānt, German critic and historian: b. Giessen, 17 Sept. 1829; d. Florence 19 Oct. 1884. For participation in the insurrection in Baden (1849) he was imprisoned, but escaped to France, where he was graduated at the Sorbonne, and in 1863 became professor of foreign languages at Douai. On the outbreak of the Franco-Prussian War, he removed to Italy and passed the remainder of his life there. Among his publications in French, German, Italian, and English, are: 'On Good Comedy' (1863); 'Contemporary Prussia' (1867); 'Italian Studies' (1868); 'Times, Peoples, and Men' (1875-85); 'History of the Government of Normandy' (1863-73); 'Public Instruction in the United States' (1869); 'Lectures on German Thought during the Last Two Hundred Years' (1880). Consult Homberger, 'Karl Hillebrand' (1884).

Hillegas, Howard Clemens, American journalist and author: b. Pennsylvania, Pa., 30 Dec. 1872. He was graduated from Franklin and Marshall College, Lancaster, Pa., in 1894, and after being connected with several Pennsylvania journals was war correspondent of the New York *World* in South Africa 1899-1900. He has published 'Oom Paul's People' (1899); 'The Boers in War' (1900); 'With the Boer Forces' (1900).

Hillern, Wilhelmine von, vīl'hēl-mē'nē fōn hīl'ēr'n, German novelist: b. Munich 11 March 1836. In early life she was an actress at Coburg, and in 1857 married Baron von Hillern who died in 1882. Her novels began to appear in 1862 and became rapidly popular. Among them are: 'Double Life' (1865); 'A Physician to the Soul' (1869); 'The Geyer-Wally' (1873). Translations of her novels have been widely circulated in America. Her efforts as a dramatist have not endured, but one or two of her novels have been adapted for the stage.

Hillhouse, James, American politician: b. Montville, 21 Oct. 1754; d. New Haven, Conn., 29 Dec. 1832. He was graduated in 1773 at Yale, of which institution he was treasurer from 1782. He studied law, and took an active part in the struggle of the Revolution; was a Federalist member of Congress in 1791, and in 1795-1810 a member of the United States senate. He was also a member of the Hartford Convention of 1815. It was chiefly through his initiative in the planting of trees that New Haven came to obtain the title of 'Elm City.'

Hillhouse, James Abraham, American poet: b. New Haven, Conn., 26 Sept. 1789; d. near there 4 Jan. 1841. He was the son of James Hillhouse (q.v.). He was graduated at Yale College in 1808, entered commerce in New York, and published in London his drama of 'Percy's Masque,' reprinted in New York with

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changes in 1820. In 1822 he removed to a country seat near New Haven, where he passed the remainder of his life. In 1825 he published his second drama, 'Hadad'; and in 1839 a collected edition of his writings appeared under the title of 'Dramas, Discourses, and other Pieces.' His dramatic writings, once greatly praised, now appear grandiose and dull.

Hilliard, hil'yard, **Henry Washington**, American lawyer: b. Fayetteville, N. C., 4 Aug. 1808; d. Atlanta, Ga., 17 Dec. 1892. He was graduated at South Carolina College in 1826, was admitted to the bar in 1829, in 1831-4 was a professor in the University of Alabama (Tuscaloosa), in 1838 was chosen to the Alabama legislature, in 1842-4 was United States *chargé d'affaires* in Belgium, and in 1845-51 represented an Alabama district in Congress. Though opposed to secession, he became a brigadier-general in the Confederate army. He was United States minister to Brazil, in 1877-81. He wrote: 'Speeches and Addresses' (1855); 'De Vane, a Story of Plebeians and Patricians' (1865); and 'Politics and Pen Pictures' (1892).

Hillia, hil'is, **Newell Dwight**, American Presbyterian clergyman: b. Magnolia, Ia., 2 Sept. 1858. He was educated at Iowa College and Lake Forest University, studied theology at McCormick Theological Seminary, entered the ministry of the Presbyterian Church, and held pastorates at Peoria, Ill. (1887-90), and Evanston, Ill. (1890-4). In 1894 he was appointed pastor of the Central Church, Chicago, an independent congregation, and in 1899 of Plymouth Church of Brooklyn. He became known also as a lecturer, and has published: 'The Investment of Influence'; 'A Man's Value to Society'; 'How the Inner Light Failed'; 'Foretokens of Immortality'; 'Great Books as Life Teachers'; 'The Influence of Christ in Modern Life'; 'The Quest of John Chapman' (1904); and many other books.

Hillsboro, Ill., city, county-seat of Montgomery County; on the Cleveland, C. C. & St. L. railroad; about 45 miles south by west of Springfield, and 52 miles northwest of East Saint Louis. Its chief manufactures are flour, furniture, woolen goods, carriages and wagons, and dairy products. There is a coal-mine nearby. It is the commercial centre of an agricultural section of the State. Pop. (1910) 3,424.

Hillsboro, Ohio, village, county-seat of Highland County; on the Norfolk & W. and the Baltimore & O. S. R.R.'s; about 60 miles southwest of Columbus and 50 miles east by north of Cincinnati. It is in an agricultural and stock-raising region. The chief manufactures are furniture, foundry products, flour, lumber, dairy products, and cigars. It is the trade centre for a large part of Highland County. It has a public library containing about 8,000 volumes, and a number of fine public and private buildings. The city owns and operates the waterworks. Pop. (1910) 4,296.

Hillsboro, Texas, city, county-seat of Hill County; on the Missouri, K. & T. and the St. Louis S. R.R.'s; about 52 miles southwest of Dallas and 38 miles north of Waco. It is situated in an agricultural and stock-raising region. Its chief manufactures are cottonseed-oil, cotton goods, hosiery, flour, candy, men's clothing, agricultural implements, and lumber. The trade

is largely in live stock, cotton, hides, grain, hay, and lumber. It has cotton-gins, cotton-compresses, planing-mills, and hay presses. The city owns and operates the waterworks. Pop. (1910) 6,115.

Hillsdale, Mich., city, county-seat of Hillsdale County; on the Lake Shore & M. S. railroad; about 88 miles southwest of Detroit and 60 miles west of Toledo, Ohio. The first permanent settlement was made about the year 1840. It is situated in a rich agricultural region in which are raised large quantities of fruit. The chief manufactures are flour, fur garments, screens for doors and windows, wagon-wheels, tables, furnaces, furniture and canned fruits. The trade, in addition to the manufactures, is chiefly in grain, fruits, vegetables, and livestock. Baw Beese Park, outside the city limits, is owned by the city. Hillsdale is the seat of Hillsdale College (q.v.). The electric-light plant and the waterworks are owned and operated by the city. Pop. (1910) 5,001.

Hillsdale College, a coeducational institution founded in 1855 under the auspices of the Free Baptist Church, in Hillsdale, Mich. Since its establishment it has graduated about 1,200 students. The number of professors and instructors in 1910 was 24, the number of students 418. Special attention is given to the classical and scientific work, but the modern languages are not neglected.

Hilo, hē'lō, Hawaii, town on the Hilo Bay, on the eastern coast of the island; about 38 miles from Mauna Loa, 36 miles from Mauna Kea (the highest peak of the group), and 28 miles from Kilauea. Hilo is the second town in size in the Hawaiian Islands. It has the best harbor belonging to the group. The lighthouse in the harbor can be seen many miles. Large lava-fields are near; on the northwest side of the town and in the vicinity are extensive forests. The craters of Loa and Kilauea, the largest in the world, are visited annually by many tourists who land at Hilo. The inhabitants of the town include many races; but people from the United States who have engaged in business in Hilo are quite prominent. Hilo has good schools to which attendance is compulsory. The population of the town, which is co-extensive with the district of the same name is (1910) 6,745.

Hilongos, hē-lōng'ōs, Philippines, pueblo of Leyte, on the southwest coast at the mouth of the Salog River, 62 miles southwest of Tacloban. It has a good harbor. Pop. 13,813.

Hilprecht, Herman Volrath, hēr'mān fōl'rāt hil'prēt, American Assyriologist: b. Hohenerxleben, Germany, 28 July 1859. He was graduated at Leipsic in 1883 and was curator of the Semitic section of the museum of the University of Pennsylvania, to which he presented the greater part of the 27,000 original cuneiform inscriptions which it contains. He was made professor of Assyrian and Comparative Semitic philology in the same institution 1886. In 1888-89 he was Assyriologist and scientific director of the University of Pennsylvania's expedition to Nippur, Babylonia, and editor-in-chief of its publications. Among his works may be mentioned: 'Old Babylonian Inscriptions, chiefly from Nippur'; 'History of the Babylonian Expedition of the University of

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Pennsylvania to Nippur'; 'Recent Researches in Bible Lands'; 'Explorations in Bible Lands during the 19th Century' (1903).

Hilton Head, an island, at the mouth of the Broad River, off the southeast coast of South Carolina; a part of Beaufort County. Fort Walker, a Confederate fortification, was erected here during the Civil War. On 5 Nov. 1861, the fort was attacked by a Union fleet, under Commodore Dupont; Commodore Tatnall, with a Confederate flotilla, or "mosquito fleet," assisted Fort Walker, but it was captured by Dupont. The reports gave Union loss 8 killed and 23 wounded; Confederates, 10 killed and 10 wounded.

Himalaya, *hīm-ā-lā-ya* or *hīm-a-lā-ya* (from the Sanskrit signifying the abode of snow), a mountain system of Asia containing the highest peaks in the world, the principal mass of which is near the southern edge of the central section of the continent, between lon. 65° and 110° E., and lat. 28° and 37° N. The system extends approximately from northwest to southeast for about 2,000 miles, while its breadth varies from 100 to between 500 and 600 miles. The elevated plateau of Tibet, between the Himalaya proper and its extension, the Kuen-Lun range, is the widest part of the system. While the term Himalaya is usually confined to the range forming the northern barrier of India, the Hindu-Kush, on the northwest, and the Karakoram with the Kuen-Lun to the north are not distinct chains as frequently represented, but are all portions of the same connected mountain mass, having very little to distinguish them from the rest of the elevated system to which they belong. The Himalaya is connected on the east with the mountains of China and the Indo-Chinese peninsula, and on the west with the mountains of Baluchistan and Afghanistan. The Pamir Plateau described as a "huge boss or knot" north of the Hindu-Kush connects the Himalayas with the Thian-Shan, another mountain system which extends northeastward for about 1,200 miles. From the Ganges-watered plain of northern India which has an elevation of about 1,000 feet above the sea, the Himalayas ascend by successive slopes. The transition from this plain to the ascent of the range is marked in the northwest by a belt of dry, porous ground, broken up into numerous ravines. East of this is the "Terai," a belt of sloping marshland covered with forest and jungle, very malarious and crowded with wild animals. Beyond this lies the "Bhabar," a belt of gravelly and sandy nature covered with forests of valuable timber trees. The "duns," "maris," or "dwars," longitudinal valleys partly cultivated and partly yielding forest growth, occupy the space between the Bhabar and the slopes of the Himalayas. The principal passes are the highest in the world and include the Ibi-Gamin pass in Garwhal 20,457 feet, the Mustagh 19,019 feet, the Parangla 18,500 feet, the Kronbrung 18,313 feet, and the Dura Ghat 17,750 feet. The greatest elevations of the Himalayan system are Mt. Godwin-Austen 28,250 feet in the Karakoram range, and in the Himalayas proper the Gaurisankar or Mount Everest 29,002 feet, the highest peak in the world, Kunchinjinga 28,176 feet, and Dhawalagiri 26,826 feet. On the north the limit of the snow line is 17,400 feet, on the south 16,200 feet. From the southern slope of

the central portion of the great chain flow the various streams which unite in the Ganges; from the southern slope of the northwestern portion spring the rivers of the Punjab or "Five Waters," which unite to swell the Indus which rises on the northern slope and flows southwestward to the Arabian Sea; also on the northern slope not far from the source of the Indus springs the Brahmaputra which flows east, southwest, and south to the Bay of Bengal; and also from the plateau of Tibet north of the main Himalayan range flow the Salwin, Mekong and other rivers of the Indo-Chinese peninsula, the Yangtse, Hwang-ho, and other rivers of the Chinese Empire. The whole system is of granitic formation associated with gneiss and mica-slate, followed in descending by metamorphic and secondary rocks, until the alluvial deposits are reached. Minerals abound; copper and lead have been mined from ancient times, iron more recently, coal is found at the foot of the mountains, gold in the beds of the mountain torrents, zinc, sulphur, plumbago and salt are also obtained, and there are numerous mineral springs. The vegetation is luxuriant; rhododendrons are in rich profusion, and there are forests of pine, spruce, silver-fir and deodar cedar at varying altitudes. Consult Schlagintweit, 'Scientific Mission to India and High Asia'; Waddell, 'Among the Himalayas.'

Hinckley, Thomas, American colonial governor: b. England, about 1618; d. Barnstable, Mass., 25 April 1706. In 1635 he emigrated to America, and settled at Scituate, but four years later removed to Barnstable. He was deputy governor of Plymouth Colony in 1680 and afterward governor.

Hincks, Sir Francis, Canadian statesman: b. Cork, Ireland, 14 Dec. 1807; d. Montreal, 18 Aug. 1885. He went to Canada in 1831, set up in business at Toronto, and there became editor of the 'Examiner.' In 1841 he entered the first United Parliament as a prominent Liberal. He undertook the editorship of the 'Pilot' of Montreal in 1844. From 1851 to 1854 he was Canadian premier, and as such developed the railway facilities and mining resources of the country, and negotiated a treaty of commerce with the United States. In 1855-62 he was governor of Barbadoes, in 1862-9 of British Guiana, later minister of finance, and from 1873 editor of the Montreal 'Journal of Commerce.' Among his publications are: 'Canada: Its Financial Position and Resources' (1849); 'The Political History of Canada between 1840 and 1855' (1877); 'The Boundaries Formerly in Dispute between Canada and the United States' (1885).

Hind, hind, John Russell, English astronomer: b. Nottingham 12 May 1823; d. Twickenham 23 Dec. 1895. In 1840 he obtained a situation in the Royal Observatory at Greenwich. He was a member of the commission appointed to determine the exact longitude of Valencia (1844), and on his return was appointed the observer in Bishop's Observatory, Regent's Park. There he calculated the orbits of more than 70 planets and comets, noted several new variable stars and nebulae, and discovered 10 minor planets. In 1851 he obtained from the Academy of Sciences at Paris the Lalande medal, and was elected a corresponding member; and in 1852 received the Astronomical

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Society of London's gold medal, and a pension of \$1,000 a year from the British government. In 1857-91 he was director of the 'Nautical Almanac,' and in 1880 president of the Royal Astronomical Society. He wrote: 'The Solar System' (1846); 'Astronomical Vocabulary' (1852); 'The Comets' (1852); 'Elements of Algebra' (1885); 'Introduction to Astronomy' (1871), and other works.

Hindman, hind'man, **Thomas Carmichael**, American soldier: b. Tennessee 1818; d. Arkansas 1868. He studied law, entered practice in Mississippi, fought in the Mexican War as a lieutenant of Mississippi volunteers, and in 1858-61 was a Democratic representative in Congress. Not long after the outbreak of the Civil War, he was commissioned brigadier-general, was defeated at Newtonia and Prairie Grove, was promoted major-general at Shiloh, and later served in Arkansas.

Hin'doos, in American history, a nickname given in New York State in 1854 to the American (q.v.) or Know-Nothing Party, from a charge that its candidate for governor, Daniel Ullmann, was born in Calcutta. He was in fact a Delaware man and a graduate of Yale.

Hinduism, in its widest sense, the religion and religious philosophy of the inhabitants of Hindustan, which is professed by nearly half of mankind. Hinduism, historically considered, presents three periods of development. The first is the Vedic age. The Vedas (q.v.) are hymns of worship, and the study of them reveals very clearly the nature worship of primitive Hindustan. In these hymns the elements of nature are addressed as divine beings. Agni, fire, lightning; Surya, the sun; Indra, the cloudless firmament; Maruts, the winds; Ushas, the dawn, are the principal deities of this poetic pantheon. They are addressed in high and sometimes beautiful language, as the senders of temporal blessings. Offerings of delicious viands are made to them; but they are not to be propitiated by bloody sacrifices of beasts, much less by human sacrifices. Libations are poured to them of soma, an exhilarating drink, made from the fermented juice of the soma (q.v.) or milk-plant. Throughout the Vedic hymns runs the under-notion of a supreme being, the creator and ruler of all. This is less discernible in the Brahmana or the Veda than in the Upanishads (q.v.). The Brahmana is a later class of Vedic hymn in which the henotheism suggested in the Upanishads has given place to a highly artificial classification of the divine powers, with a careful estimate of the rank of each. In the Upanishads, Agni, Indra, and Surya become symbols whose united significance may help the mind to understand the existence of one supreme and absolute being, and in this class of Vedic hymn we see the principles of the most enlightened form of native religion in India. The one world soul, in all its manifestations, is reflected in the soul of man, whose destiny is to be reunited with it. The moral responsibility of man, and the judgment of the supreme being against wrong-doing, are plainly taught in these hymns; but there is no trace in them of the later doctrine of moral purification through reiterated metempsychosis.

The second period in the development of Hinduism may be called the epic period. It re-

ceives full illustration in the great epic poems, the Ramayana, and the Mahabharata. Side by side with the pictorial teaching of these poems, in which an attempt is made to present the working of the divine economy in relation to specific human lives, there rises a philosophical system, rudimentary indeed, but laying foundations for the later Sankhya, Nyaya, and Vedanta systems. In the Mahabharata, with all its episodes and fantastic incidents, is vividly put forth the doctrine that the union of the human soul with the great, divine soul of the world is aided and expedited by penances of various sorts, such as are detailed with systematic prolixity in the Yoga. In the epic period the doctrine of metempsychosis is clearly enunciated. The soul, after the death of its temporary possessor, must be born again in some material semblance, in order that it may complete the work left unfinished in some previous state of existence, and must repeat the same experience until its task be accomplished and perfection be attained. A decided change is apparent in the popular Hinduism of the third or Puranic period (see PURANAS; TANTRAS). In the Puranas there is almost a Götterdämmerung discernible; no longer do peace and concord prevail in the pantheon where Brahma, Vishnu and Siva still reign supreme, but all is discord, confusion, and destruction. The legends of the epic poems are amplified with childish variations. The simple ideas of the Vedic hymns have vanished. The unbridled imagination of imitators and commentators has overstepped the limits of reverence, dignity, and even poetic beauty in the Puranas, which do not show any advance even in philosophical earnestness, acuteness, or profundity. Worship has become an empty ceremonial. The Vedanta philosophy is now the intellectual creed of the thoughtful and learned (see VEDANTA), and this philosophy is a sort of Deistic agnosticism, only slightly more definite than that of Herbert Spencer, as propounded in his 'First Principles.' For it is the main tenet of the Vedanta that there is one supreme divinity, but, however imagination and speculation may seek to invest this first principle with all the perfections which the human mind is capable of conceiving, the essence of the one divine being lies far beyond the grasp of human thought.

The philosophical creed and henotheism of the educated Brahmin is a sort of esoteric Hinduism which has not supplanted among the general people the influence of a wild polytheism. While it is said that the inferior gods of India make up a pantheon of 330,000,000 divinities, the most important among them are but few in number. These are styled "Guardians of the World," and comprise the elemental gods worshipped in the Vedic hymns. Next in rank to Vishnu, Siva, and Brahma, the supreme triad, are Indra, Agni, Yama (the god of hell), Surya, Varana (the god of water), Purana (the god of wind), Kuvesa (the god of wealth), Soma or Chandra (the moon god), etc. Among sacred animals are bulls; snakes, whose union with the demigods produced monkeys, and some birds, such as the ganada. Among trees, the banyan is held to be divine.

The sects of Hinduism are numerous, and their existence illustrates a principle which is

found to have prevailed in the mythological religion of Greece. Each of these sects worships a particular divinity, and teaches that this divinity possesses all the attributes of a supreme being. Thus polytheism does not mean in India, generally, the worship of many gods by each devotee, but very often merely the worship of one god under many names. For example, the Saivas worship Siva; the Sauras, Surya the son; the Ganapatyas, Ganesa, the god of wisdom, and so on to an almost indefinite length. They ask from each of these gods the same gifts, and the exercise of the same powers. Other sects are Buddhists, Jainas (q.v.), and Sikhs (q.v.). These last profess a pure theism, yet blended with all the absurdities of Hindu mythology and the monstrous fables of Islam; nevertheless they despise Hindus and Mussulmans alike and do not recognize the distinctions of caste. They reject all the Hindu sacred books and look upon warfare as a religious duty. This sect was founded at the beginning of the 16th century A.D. by Nanak Shah.

The philosophy of Hinduism is almost altogether occupied with those questions for which a religious solution is generally sought, namely, the origin and destiny of man, and his relation to the supreme being or the absolute. There are six schools of this philosophy, namely, the Nyaya, Vaiseshika, Sankhya, Yoga, Mimansa, and Vedanta. They all agree in essential points. Their object is to prescribe rules by which man may be delivered from the bondage of ignorance, and be absorbed into the deity. Their doctrine of the soul as something eternal and inextinguishable, distinct from mind, senses, and body, yet sharing in the merit or guilt of good or bad deeds, the latter of which are caused by ignorance of what is best and highest, is identical. They all teach the doctrine of metempsychosis and accept the authority of the Vedas. There is complete agreement among them as to how ignorance is to be gradually illuminated and right apprehension acquired; to this end the Scriptures must be studied and clearness of intellect and heart secured by sacrifices, alms giving, pilgrimages, the repetition of sacred words. The Sankhya are atheistic in their belief, but all the other schools teach the existence of one supreme being.

Consult: Wurm, 'Geschichte der Indischen Religion' (1874); Vergaigne, 'La Religion Védique d'après les Hymnes du Rig-Véda' (1878-83); Barth, 'Les Religions de l'Inde' (1879); Muir, 'Original Sanskrit Texts'; Colebrook, 'Essays on the Religion and Philosophy of the Hindus' (1858); Mullens, 'Religious Aspects of Hindu Philosophy' (1860).

Hindustan, hīn-doo-stān', **Hindostan**, hīn-dō-stān', or **Indostan**, signifying "the land of the (river) Indus," a word of Persian derivation, formerly applied to India (q.v.).

Hingham, hīng'am, Mass., town in Plymouth County; on Massachusetts Bay, and on the New York, N. H. & H. railroad; about 15 miles southeast of Boston. In the town are the villages of South Hingham, West Hingham, and Hingham Centre. The first permanent settlement was made in 1633, and it was then called Barecove. In 1635 it was incorporated under its present name. Its chief manufactures are awnings, cordage, wooden-ware, toys, boot-heels, furniture, leatherette and upholstery. It

has a meeting-house which was built in 1681. It contains a public library and is the seat of Derby Academy. Some of the noted people who have lived in Hingham are John A. Andrew, John D. Long, Benjamin Lincoln, and James Hall, the famous geologist who for a number of years was State geologist of New York. Joshua Hobart, the Puritan ancestor of the Hobarts of New York State, lived in Hingham. Pop. (1910) 4,965. Consult: 'History of the Town of Hingham.'

Hink'son, Katherine Tynan, Irish novelist and poet: b. Dublin, Ireland, 3 Feb. 1861. She was educated in a convent at Drogheda and since her marriage to H. A. Hinkson in 1893, has lived in Ealing, a suburb of London. She is a voluminous writer of prose and verse, and her books are well known in the United States. Among them may be named: 'Shamrocks,' verse (1887); 'The Way of a Maid' (1895); 'Oh! What a Plague is Love' (1896); 'Three Fair Maids' (1900); 'That Sweet Enemy' (1901).

Hinman, Russell, American editor of text-books: b. Cincinnati 23 Jan. 1853. He was educated at Antioch College, Ohio, went into business as a civil engineer; and later became editor of geographical text-books for Messrs. Van Antwerp, Bragg & Co. of Cincinnati. Since 1890 he has been in charge of the editorial office of the American Book Co. He has written 'Eclectic Elementary Geography'; 'Eclectic Complete Geography'; 'Eclectic Physical Geography.'

Hinoyossa, hē-nōi-ōs'sā, **Alexander d'**, Dutch colonial governor in America: b. and d. Holland. He came to America in 1650 as lieutenant in a small military force sent to accompany 150 immigrants. In 1659 he became director of Nieuer Amstel, a Dutch colony on the eastern bank of the Delaware River. Although, owing to disagreements and illness, this colony was not at first a success, it was greatly developed by Hinoyossa's wise rule. Hinoyossa was for a time involved in a conflict of authority with Director Petrus Stuyvesant of New Amsterdam, who had general superintendence of the commissioners constituting the government of Nieuer Amstel. In 1663 he obtained authority over all the settlements on the Delaware. The Swedish colonists submitted, and Stuyvesant relinquished his control. Upon the conquest of New Netherland by England, Hinoyossa returned (1674) to the continent where he fought in the Dutch army against the French invasion by Louis XIV.

Hin'ton, Richard Josiah, American author: b. London, England, 25 Nov. 1830; d. 20 Dec. 1901. He settled in the United States in 1851; studied topographical engineering at the Columbia School of Mines; and removing to Kansas in 1856 became a supporter of the cause of John Brown. He served in the National army in 1861-5; and was the first white man appointed to raise and lead colored troops. After the war he engaged in newspaper work in Washington, New York, and San Francisco. He was the author of 'Life of William H. Seward'; 'Life of Gen. P. H. Sheridan'; 'John Brown'; etc.

Hip, that part of the trunk comprised between the abdominal wall and the lower limb,

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particularly the region over the hip-bone (the crest of the ilium).

Hip Joint, the joint of the upper leg or thigh (femur) where it joins the trunk. It is a ball and socket joint, formed by the sinking of the smooth globular cap into the deep hollow, called acetabulum (vinegar bowl), of the os innominatum. Its movements are controlled by five ligaments: the capsular; the ilio-femoral; the teres; the cotyloid; and the transverse. These movements are more wonderful than even those of the arm, being flexion, extension, abduction, adduction, and rotation inward and outward. It is the most powerful joint in the body and hardest to dislocate.

Hip Joint, Disease of, a disease of the ball and socket of the hip. It often results from scrofula; comes on in children or young persons, from very slight causes; is often traced to a long walk, a sprain in jumping, or a fall. In the early stage of the disease the whole of the structures of the joint are inflamed and after proper treatment may be sometimes subdued with no worse consequences than a more or less rigid joint. Usually, however, abscesses form around the joint, and often communicate with its interior; and the acetabulum and the head and neck of the thigh-bone become disintegrated, softened, and gritty. In a still more advanced stage, dislocation of the head of the thigh-bone commonly occurs, either from the capsular ligament becoming more or less destroyed, and the head of the bone being drawn out of its cavity by the action of the surrounding muscles, or from a fungous mass sprouting up from the bottom of the cavity, and pushing the head of the bone before it.

As the disease advances, abscesses occur around the joint. True shortening of the limb now takes place, which at the same time becomes adducted and inverted. From this stage, if the health is pretty good, and the lungs are sound, the patient may be so fortunate as to recover with an ankylosed (or immovable) hip-joint; but the probability is that exhaustion and hectic will come on, and that death will supervene, from the wasting influence of the purulent discharges occasioned by the diseased bone.

Hipparchus, hī-pār'kūs, Greek astronomer: b. Nicæa in Bithynia. He lived about 160-125 B.C.; resided for some time at Rhodes, but afterward went to Alexandria, then the great school of science. A commentary on Aratus is the only work of his extant. He first ascertained the true length of the year, discovered the precession of the equinoxes, determined the revolutions and mean motions of the planets, prepared a catalogue of the fixed stars, etc.

Hipparion, hī-pār'i-on, a genus of fossil three-toed *Equida*. See HORSE, EVOLUTION OF.

Hippelates, a genus of midges to whose agency is ascribed the spread in many instances of the southern ophthalmic disease of cattle called pink-eye. See FLIES; PINK-EYE.

Hippocrates, hī-pōk'ra-tēz, Greek physician, the father of medicine: b. in the island of Cos 460 B.C.; d. Larissa, Thessaly, 357 B.C. Besides practising and teaching his profession at home he traveled on the mainland of Greece. His writings, which were early celebrated, became the nucleus of a collection of medical

treatises by a number of authors of different places and periods, which were long attributed to him, and still bear his name. The best edition is that of Littré (in 10 vols. Paris, 1839-61). He has the great distinction of having been the first to put aside the traditions of early ignorance and superstition, and to base the practice of medicine on the study of nature. He maintained, against the universal religious view, that diseases must be treated as subject to natural laws; and his observations on the natural history of disease, as presented in the living subject, show him to have been a master of clinical research. His accounts of phenomena show great power of graphic description. In treating disease he gave chief attention to diet and regimen, expecting nature to do the larger part. His ideas of the very great influence of climate both on the body and the mind, were a profound anticipation of modern knowledge. He reflected in medicine the enlightenment of the great age in Greece of the philosophers and dramatists.

Hippodrome (from the Greek, *Hippos*, a horse, and *Dromos*, a race course), the name given by the Greeks to places where races were held. This included both chariot and single horse racing, but the hippodrome later took the form of a circus, other games, such as wrestling, boxing, running, etc., being added, and for a short time after the introduction of Roman customs and manners it became the scene of gladiatorial combats, but as sights of this nature did not find favor in the sight of the Greeks, these combats were eventually eliminated and the main feature of the games, as in the beginning, was the chariot race. To the brutal taste of the Roman populace flowing blood acted as an elixir, but to the more refined Eastern people the amphitheatre was abhorrent. Though numerous amphitheatres were scattered throughout western Europe very few were ever built within the limits of the Eastern empire and then only where the influence and manners of the Romans were most powerful.

The first mention of a hippodrome is made by Homer, but it is believed that the term then applied to any course over which a race of any kind was run and that it did not necessarily have a fixed location. As the chariot-racing became the national game, the proper courses for the holding of such events became necessary, as in these races, though much of the success depended upon the courage and skill of the driver, the loss of life was often great, through collision, the overthrow of the chariot in turning caused by rough ground, the breaking of an axle, or numerous other accidents. The hippodrome was built for the purpose of avoiding, as much as possible, the possibility of such mishaps, by providing a wide and smooth track, thus leaving plenty of space for the contestants. Of the ancient hippodromes (as distinguished from circus, amphitheatre, etc.), probably the most famous are those of Olympus and of Constantinople, and while the Circus Maximus of Rome may to a great extent have been more of a circus than race course, it was planned after the Greek race courses, was used by the Romans for this purpose, and thus may properly be classed with the other two.

The origin of the hippodrome at Olympus tradition gives to Hercules, but the only de-

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scription of it obtainable is found in the passages of Pausanias (v. 15 § 4; vi. 20 § 7 foll.) though from the explorations of the German archaeologists the ground plans of most of the structures described by Pausanias have been traced. Of its length and breadth there is no precise information, the overflow of the Alpheus River having washed away the indications of its limits, though probably the distance from the starting place of the races to the goal, or from one goal to the other, was 770 metres or 4 Olympic stadia, and it was about one fourth as wide, or the same as each side of the starting place.

In general form the hippodrome was an oblong, one end of which was semicircular; on three sides having seats for the populace and on the fourth, where the races were started, seats for the royalty and nobles. The right side, formed by an artificial mound, was a little longer than the left side, which was built on the natural slope of a hill, the base of the fourth side being formed by the portico of Agnaptus, named after its builder. The form of the starting place was not unlike the prow of a ship, each side being 400 feet long, and containing stalls for the chariots and their horses. In the arena were two goals around which the chariots passed several times to complete the race; one of these goals having a bronze statue of Hippodameia upon it, the other an altar dedicated to "Taraxippus, the Terror of the Horses." The principal difference between the Greek hippodrome and the Roman circus was in the width of the arena, in the latter only four chariots being able to race at one time; there was also some slight difference in the arrangement of the carceres.

The erection of the hippodrome of Constantinople was due to two Roman emperors, Septimius Severus and Constantine the Great, who each in turn captured Byzantium by storm. About six years after its capture by him (197 A.D.) Severus commenced operations a little to the west of Byzantium, but in that year was called away by a rebellion in the West and never returned to the city. For over a hundred years it remained untouched, until 323, when Constantine, having conquered the city, pushed the work to completion after changing the details in the original plans. On 11 May 330 it was inaugurated.

The external appearance of the hippodrome was imposing for its vastness, its height, and even for its beauty. The walls were of brick, laid in arches, and faced by a row of Corinthian columns 260 in number and standing 11 feet apart. There were four entrances from the city each flanked with towers, but of the stairways leading to these entrances no description has come down to us.

Some idea of the immensity of this prodigious structure may be given by the fact that its dimensions were 1,400 feet in length by 400 feet in width, covering an area of 535,866 square feet, or 12.3 acres. On the north was a structure containing the apparatus for the games, the servants' and attendants' apartments, the chariots and horses, the arsenal, etc., called by the Romans the *carceres* and by the Greeks *μυγγαρα*. This apartment was separated from the arena by pillars with latticed gates, 12 in number. Next to these gates was the little church or oratory, where the rival contestants prayed before the games.

The ground story was 20 feet high. On it

rested the palace of the Kathisma or Tribunal, in the centre of which, supported upon 24 marble pillars was the platform in Kathisma proper, on the front of which was the emperor's throne. On either side and a little below the emperor were the seats for courtiers, ambassadors, etc. Far down the western side of the hippodrome and nearly opposite the built column was the gorgeous chamber of the empress, this supported upon four porphyry pillars and hence called the *tetrakion*.

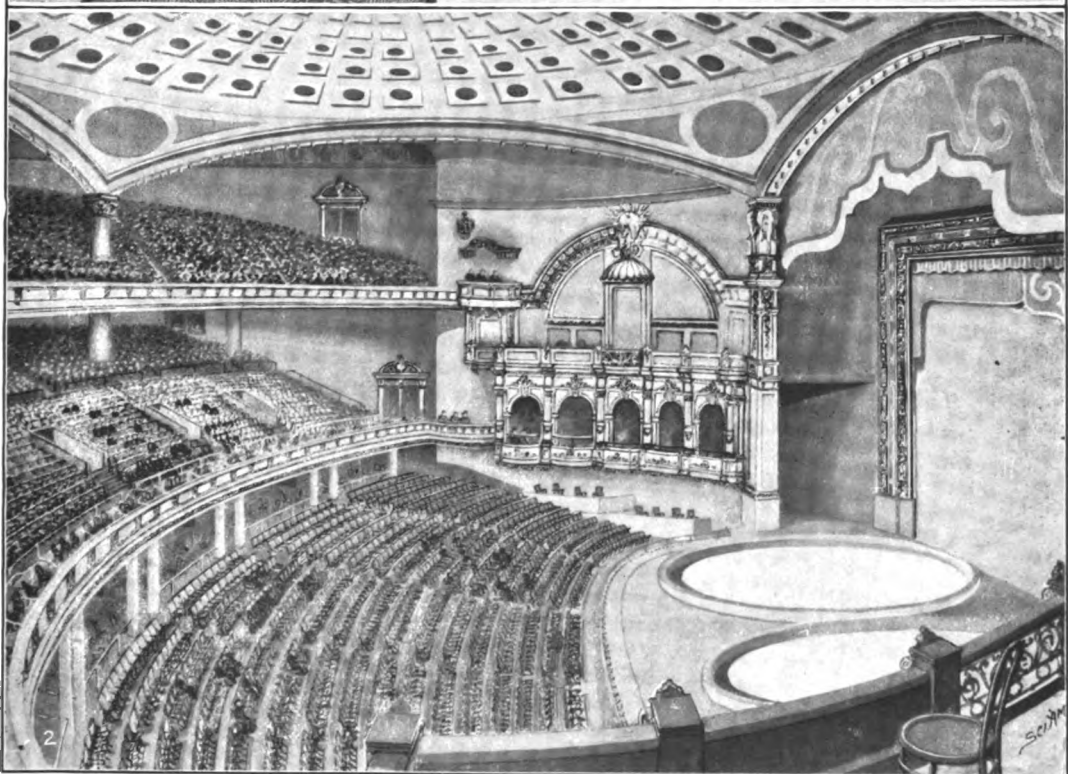
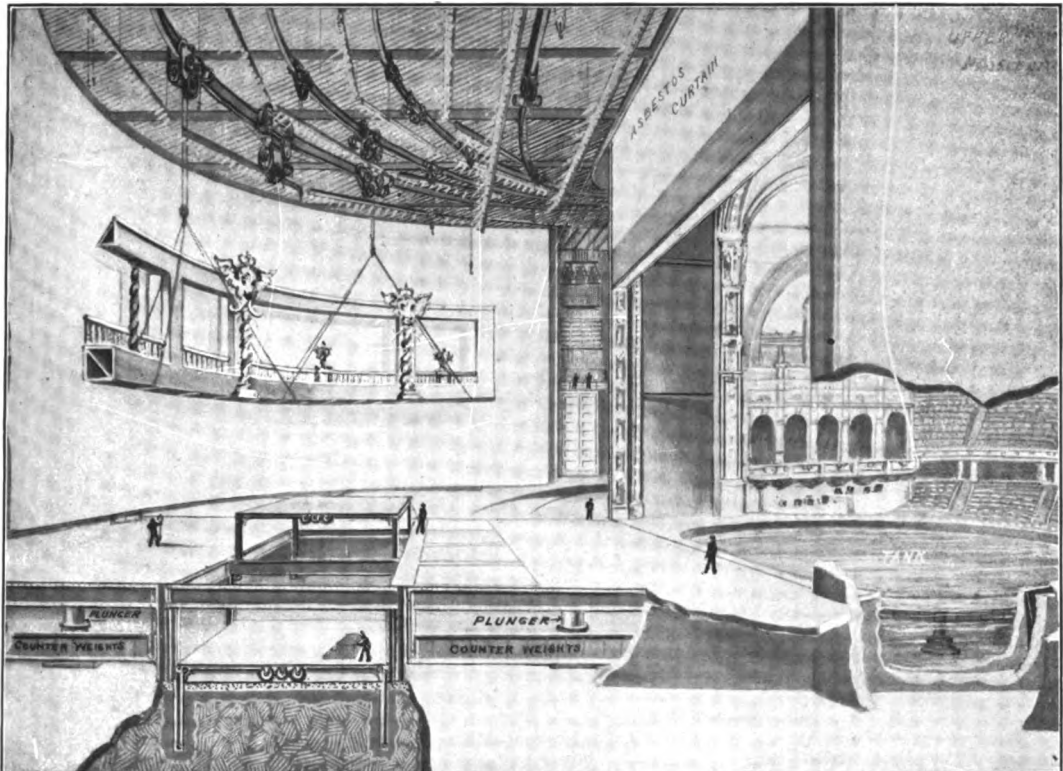
The eastern, western, and southern portions were occupied by parallel rows of seats, appropriated to the spectators according to their rank. Behind these rose tier upon tier of benches until nearly half way to the top where was a broad promenade bounding the entire extent of the hippodrome except on the northern side. This promenade was without roof or covering, and, standing nearly 40 feet above the ground, protected by a solid marble railing reaching to the breast, the spectator had a spacious avenue 2,766 feet long. It is estimated that the hippodrome would seat 60,000 persons and have comfortable standing room for 20,000 more, while with a little crowding 100,000 might be accommodated.

The arena was 211 feet wide by 1,190 feet long and was bounded by a narrow walk called the *Euripus*, paved in tessellated stone. The semicircular southern portion of the arena, that included in the curve of the *Sphendone*, was reserved for the criminals and there too was the place for executions. In the centre of the arena and lying parallel to it was the *Spina*; a stadium, 607 English feet in length, it marked and governed the beginning, duration, and end of each course of a race. At each end of the *Spina* was a high, narrow framework, surmounted by seven poles, on one group being placed seven fish, on the other seven eggs; one of each was taken down upon the completion of each circuit during the race until the race finished. Toward the southern end of the *Spina* was the *Phiale*, a broad basin of running water devoted to the victims of accidents. The space between the northern goal and the carceres was called the *Stama*, where wrestlers and acrobats performed.

Many additions to the works of art already gathered by Constantine were made during the 700 succeeding years, but in 1203 the hippodrome was sacked by the Franks and Venetians and all were either carried off or destroyed. The most famous of these was the 'Four Golden Steeds,' which was stolen by the Venetians and which in turn was brought to Paris by Napoleon, and is now standing guard over the main entrance of the cathedral of Saint Mark. Among the others are the statues of Hercules, the She-wolf and Hyæna, the Virgin Goddess Diana, the Brazen Ass, the Caledonian Boar, Helen of Troy, the God of Wealth, and eight Sphinxes, beside the statues of the early Roman emperors, martyrs, teachers, philosophers, etc. In the early days of the city games were of frequent occurrence, but as time went by they became less and less frequent owing probably to the great cost (it is estimated that a single celebration cost 1,000,000 francs) and at last were celebrated only on 11 May and 25 December, the birthdays of the city and Christ respectively.

It is not known precisely when this hippodrome was entirely destroyed, but as there is no definite reference to any chariot race later than the reign of Isaac Angelus, who was dethroned

HIPPODROME



MECHANICAL FEATURES OF THE NEW YORK HIPPODROME

1. Stage, showing mechanism of movable portion and electric hoist for handling scenery. Tank beneath front stage or apron.
2. The auditorium, the front stage or apron, and the proscenium arch.

Univ. Library, UC Santa Cruz 2001

HIPPOPOTAMUS

in 1195, and as the place was sacked in 1203-4 it is probable that it did not survive the beginning of the 13th century.

The Circus Maximus at Rome was for a long time the only structure of its kind in the world, taking its form from the Greek hippodrome and furnishing the model for all later *circi*. In the Vallis Murcia, between the Palatine and Aventine hills, wooden seats were first constructed by Tarquinius Priscus (Liv. I., 35); were frequently burned and rebuilt until the time of Julius Cæsar, when the steps were constructed of stone and greatly improved. At that time it probably accommodated about 100,000 people. After its destruction by fire in 31 A.C. Augustus completely restored it, making several magnificent additions. The upper tier of seats on the Aventine side was again destroyed by fire in 36 A.D., but Claudius not only restored these, but greatly enlarged the entire circus. These additions were supplemented by others made during the reigns of Trajan and Constantine until it was estimated that the circus held 385,000 spectators, while the 'Notitia' places the possible number at 485,000.

The general plan of the Circus Maximus compared favorably with the Greek hippodromes, the main difference being in the arena around which Cæsar had constructed a moat 10 feet wide and 10 feet deep to prevent beasts from injuring the spectators, and in the width of the arena as before stated. Before the reign of Augustus the circus was used for gladiatorial fights with wild beasts and other forms of butchery, but after the erection of the amphitheatre of Statilius Taurus the circus was no longer used for such purposes. The popularity of this as of the Greek hippodrome also declined and it gradually decayed, now only a few of the remains standing.

The term hippodrome has also been applied to race tracks in England and on the continent, the most famous of these so called hippodromes being those at Vincennes, Longchamps, Chantilly in France, Newmarket and Epsom in England, and Curragh in Ireland. The modern hippodrome, or indoor circus, had its beginning in Paris, where the first was constructed in 1845. It was built entirely of wood, the arena was 108 metres long and 104 wide, and it had a seating capacity of 15,000 persons. This was destroyed in 1870 by fire. The word hippodrome was first utilized in this country when Franconi conducted a circus where now stands the Fifth Avenue Hotel, at 23d Street and Fifth Avenue, New York.

The first hippodrome of the accepted type to be built in America was the New York Hippodrome, which occupies an entire block on Sixth Avenue, between 43d and 44th streets. This structure was begun on 1 July 1904 and finished in five months, the opening performance occurring 12 April 1905. The main façade has a length of 200 feet, and the building extends 240 feet east on 43d and 44th streets. It is built of brick, marble, and steel, and rises to a height of 72 feet on Sixth Avenue, and 110 feet in the rear, the total cost being \$1,750,000. It is the largest playhouse in the world, having a seating capacity of 5,200.

In the interior decorations the general scheme of coloring is a Roman red as a background, with all the structural features done in ivory, gold, and silver. The carpetings are of the same

color, and the wall hangings, draperies, and upholstery are executed in a Roman red velvet enriched with heavy gold and silver embroidery and tassels.

The auditorium is about 160 feet long and 160 feet wide in the first story, and the balcony and gallery occupy the building in front of the stage above the first story. At the rear of the balcony is the mezzanine floor, below the rear seats of the balcony being the wide segmental promenade with main entrances and flights of shallow stairs at each end leading to the street. Behind the promenade the space, 20 to 50 feet wide and 200 feet long, is occupied by smoking rooms, parlors, waiting rooms, and cloak rooms. The promenade and lobbies are finished in marble and cæn-stone, relieved by rich illuminations of the ornamented parts in gold and silver. A special feature of the auditorium is the arrangement and construction of cages for animals of the feline kind. Their dens are arranged in a segmental curve in the promenade floor, and have plate glass fronts with iron bars behind.

The chief point of interest in the hippodrome centres the stage and the entirely novel mechanical arrangements for operating the movable platforms, filling and emptying the tank, raising and lowering the stage, and handling the scenery. The depth of the stage from the extreme front to the back wall is 110 feet, or 50 feet from the back wall to the proscenium opening and 60 feet from the arch to the front of the stage. This latter part of the stage lying forward of the proscenium arch is known as the "apron." It is large enough to contain two regulation circus rings, each 42 feet in diameter. Beneath the "apron" is built a huge steel and concrete tank, over 14 feet in depth, and large enough for the whole "apron" to sink within it. When aquatic performances or naval pageants are given the tank is filled with water and the movable "apron" is submerged below the water to the bottom of the tank.

Bibliography.—As before stated, the only description of the Olympia as it originally stood is contained in 'Pausanias' (v. 15 § 4; v. 120 § 7 foll.). From results of excavations the best descriptions of the old hippodromes of the world may be had in the following: Curtius, 'Olympia' (Berlin 1852); Grosvenor, 'Hippodrome of Constantinople' (London 1889); Lehdorf, 'Hippodromos' (Berlin 1876); Pollack, 'Hippodromica' (Leipsic 1890). For descriptions of chariot races consult: Homer's 'Iliad,' and Livy, and 'Lew' Wallace, 'Ben Hur' (New York 1880). Of the New York Hippodrome probably the best description is contained in the 'Scientific American' (Vol. XCII., No. 12; 25 March 1905). For a study of the architectural features of the structures of those times consult Sturgis, 'European Architecture' (New York 1896).

Hippopot'amus, the generic and popular name of a great amphibious ungulate, allied to the swine, of which two species are known. One (*H. amphibius*) is common throughout the greater part of Africa; the other (*H. liberiensis*) is not only smaller, but has other important differences, and is found only in the African west coast rivers, and those flowing into Lake Tchad. The former species has a thick and square head, a very large muzzle, small eyes

HIPPURIC ACID — HIRTH

and ears, thick and heavy body, short legs terminated by four toes, a short tail, two ventral teats, skin about two inches thick on the back and sides, and without hair, except at the extremity of the tail. A curious feature of the skin is the reddish exudation which pours from its pores when the animal is excited or in pain. It is called "bloody sweat," but the blood has no part in it. The incisors and canines of the lower jaw are of great strength and size, the canines or tusks being long and curved forward. These tusks sometimes reach the length of two feet and more, and weigh upward of six pounds. The animal is killed by the natives partly as food, but also on account of the teeth, their hardness being superior to that of ivory, and less liable to turn yellow. The hippopotamus has been found as much as 14 feet long, and nearly 5 feet high, but usually measures much less. It delights in water, living in lakes, rivers, and estuaries, and feeding on water-plants or on the herbage growing near the water, where it can walk as well as swim. It often leaves the water after nightfall, and goes, sometimes long distances, to grassy pastures to feed; regular paths are worn through the reeds, and here the Africans often arrange pits, deadfalls, or other traps for their capture. These animals are quick of sense, timid and anxious to escape danger; but when brought to bay or enraged prove formidable antagonists and often destroy canoes. They are excellent swimmers and divers, and can remain under water eight or ten minutes. The behemoth of Job is considered to be the hippopotamus. Several extinct species are found in Old World Tertiary formations, and modern species formerly inhabited not only Madagascar, but southern Europe and India, where they were contemporary with the men of the Stone Age.

Hippuric (hī-pū'rifk) Acid, an organic acid, $C_9H_7NO_3$, existing in the urine of herbivorous animals, and, in small quantities, in that of human beings. It is increased by a vegetable diet, and by the disease called diabetes, and may be caused to appear in the human urine in considerable quantities by the administration of benzoic acid with the food. It is most conveniently prepared by boiling horse urine with milk of lime, filtering, neutralizing with hydrochloric acid, and evaporating to about one eighth of its volume. The concentrated urine is then acidified with hydrochloric acid and allowed to stand, when impure hippuric acid comes down as a yellowish-brown precipitate. To purify the crude product, it is heated to $212^\circ F.$ with not quite enough water to entirely dissolve it, and chlorine gas is passed through the solution until the unpleasant smell has entirely disappeared. The solution is then filtered while hot, and the crystals which separate upon cooling are isolated and subjected again to the same treatment, the chlorine being passed through the solution, in this second treatment, until the solution is bright yellow. When thus prepared, hippuric acid crystallizes from water in the form of large prismatic plates, belonging to the trimetric system. Its crystals are colorless or white, free from odor, and have a slightly bitter taste. Hippuric acid has a specific gravity of about 1.308, and melts at $369^\circ F.$; it begins to boil at about $465^\circ F.$, giving off benzoic acid and benzonitrile. It is insoluble in benzene, carbon

disulphid, and cold chloroform, and is but slightly soluble in ether and in cold water. It is very soluble, however, in boiling water, and in hot alcohol. With bases, hippuric acid forms salts that are remarkable for the beauty of their crystalline forms. When boiled with dilute hydrochloric, sulphuric, nitric or oxalic acid, it yields benzoic acid and glyccoll.

Hiram College, a coeducational institution, founded in 1850, in Hiram, Ohio, under the auspices of the Christian Church. It was first called the Eclectic Institute, but was incorporated as a college in 1870. In 1910 there were in attendance about 400 pupils in the departments of oratory and music and in the preparatory department and college. There are about 6,200 volumes in the library.

Hiroshima, hē-rō-shē'mā, Japan, a town on the island of Hondo, about 160 miles from Kobe, and after Osaka the most important port on the inland sea.

Hirsch, hīrsh, **Emil Gustav**, American rabbi: b. Luxemburg, Germany, 22 May 1852. He studied at the University of Pennsylvania and at Berlin, was rabbi successively in Baltimore, Md. (1877) and Louisville, Ky. (1878-80), and in 1880 was chosen minister of the Sinai congregation of Chicago, Ill. In 1880-7 he was editor of the 'Zeiteist' of Milwaukee, Wis., and later became editor of the 'Reform Advocate' of Chicago. He was appointed professor of rabbinical literature in Chicago University in 1892. He appeared as an orator on various patriotic and other occasions, and wrote several monographs on religious and Biblical topics. He was also prominent in Republican State politics, and in 1896 was presidential elector-at-large for Illinois.

Hirsch, Maurice, **BARON DE (BARON MAURICE DE HIRSCH DE GEREUTH)**, Austrian Jewish capitalist and philanthropist: b. Munich 9 Dec. 1831; d. Ogyalla, Hungary, 21 April 1896. His fortune was computed to be \$200,000,000, and his yearly income at about \$20,000,000. His benefactions equaled nearly \$100,000,000, the most of this sum being directed toward the improvement of the condition of the Jews in all parts of the world. The De Hirsch trust for the United States is a fund of \$2,500,000 for the Americanizing and education of Rumanian and Russian Jews. Other large gifts were those of \$5,000,000 for the endowment of schools in Galicia, and of \$50,000,000 to the Jewish colonization association for the establishment of colonies in Argentina. In 1888 he offered to the Russian government \$10,000,000 for schools, with the condition that in the distribution of the amount no discrimination as to race or religion be made. This offer was not accepted. Baron de Hirsch made extensive sums through the construction of railways in Turkey.

Hirth, hērt, **Friedrich**, German-American educator: b. Gräfontonna, Saxe-Coburg, Germany, 1845. He studied at Leipsic, Berlin, and Greifswald, entered the Chinese customs service in 1870; retired in 1897, and in 1902 was called to the newly created professorship of Chinese in Columbia University. In the summer of 1902 he was in St. Petersburg, cataloguing a collection of manuscripts taken at Peking. He made a valuable collection of Chinese porcelains, now in the museum at Gotha, and one of printed



HIPPOPOTAMUS (*Hippopotamus Amphibius*)

Univ. Library, UC Santa Cruz 2001

HISCOCK—HISTORICAL SOCIETIES IN THE UNITED STATES

books and MSS., now in the Berlin Royal library. Among his publications are: 'China and the Roman Orient' (1885); 'Ancient Porcelain' (1888); 'Chinesische Studien' (Vol. I, 1890); and 'Ueber fremde Einflüsse in der Chinesischen Kunst' (1896).

His'cock, Frank, American legislator: b. Pompey, Onondaga County, N. Y., 6 Sept. 1834. In 1855 he was admitted to the bar, in 1860-3 was district attorney of Onondaga County, and in 1867 a member of the State constitutional convention of New York. He was a Republican representative in Congress in 1879-87, and obtained recognition as a party leader and speaker. In 1887 he was United States senator from New York and then returned to professional practice.

Hispania, his-pá'ní-á. See SPAIN.

Histol'ogy, the science of animal and vegetable tissues. It investigates by means of the microscope the various tissues of man, animals and plants in their anatomical relations and compositions. Topographical histology considers the more minute structures of the organs and systems of the body; normal histology deals with the healthy tissues; and pathological histology investigates the changes they undergo in disease. Marie François Xavier Bichat (1771-1802) is generally credited with the foundation of the science of histology. Unfortunately the imperfect condition of the microscope in his time prevented Bichat and his contemporaries from carrying their investigations to the point which Schleiden, Schwann, Johann Müller, Virchow, Von Recklinghausen, Cohnheim, etc., have reached. It has been found that all structures however complex are made up of cells, and that the parts of a body may be resolved into a small number of elementary tissues now grouped as: (1) epithelium, which lines almost all the cavities of the body and is directly or indirectly in communication with the atmosphere; (2) the nervous tissues, which as nerve cells originate and as nervous fibres transmit all nervous impulses; (3) muscle, which produces motion whether voluntary or involuntary; (4) glandular tissue which consists of cells standing in close relation with the blood-vessels which take from the blood certain substances and secrete them; (5) connective substances which support and hold together the more delicate and important structures, especially forming the cartilages and bones. See CELL; ANATOMY, COMPARATIVE; ANATOMY OF PLANTS.

Many tissues have the power of repairing injuries that happen to them. This power is called regeneration, and is found especially in the lower animals, in polyps, worms, and in many amphibious creatures and reptiles. In other cases the lesion is supplied by a new growth of connective substance. In diseases the tissues undergo many changes and many of these diseases in the organism are shown also by the changing of color. The science of such changes is generally called pathological histology. It is a comparatively young science and has been cultivated by Virchow, who was the founder of cellular pathology.

Vegetable histology is that department of botany which deals with microscopic phytotomy or the anatomy of plants, especially investigating the plant cells and plant tissues. It is properly

subordinate to morphology and is a distinctively descriptive science. It deals with the question in what relation the cells or forms of tissue stand to the vital activity of plants, what functions they perform, and in what respect they are constituted for the fulfilling of those functions. (Compare CYTOLOGY.) Owing to the excessive minuteness of the cells which form the tissues of all plants the investigation relies almost entirely on the microscope, and naturally has made its advance in proportion as the microscope has been made more perfect. Microscopes that are now used magnify at least 1,000 diameters, and the materials used have to be carefully prepared and mounted. Many of them have to be colored with hæmatoxylin, fuchsin, saffranin, and other alcoholic or aqueous dyes. Consult Delafield and Prudden, 'Handbook of Pathological Anatomy and Histology' (1901).

Historical Societies in the United States. John Pintard, of New York, deserves the credit of being the first who endeavored to organize historical societies in the United States. He was born 18 May 1759, received his education at Princeton College, and became actively identified with several military expeditions in the War of the Revolution, being also deputy commissary for American prisoners. He was especially zealous in the study of American history, and appreciated the need of preserving the literature, muster-rolls, private and public documents, relics, and other material of the colonial period, at that time uncollected. In 1789 he visited the Rev. Jeremy Belknap, in Boston, who writes: "When Mr. Pintard was here he strongly urged forming a society of antiquarians." In August 1790 Mr. Belknap, following this suggestion of Mr. Pintard, drew up an outline for such a society, in which was the following clause, "Letters shall be written to gentlemen in each of the United States requesting them to form similar societies and a correspondence shall be kept up between them for the purpose of communicating discoveries and improvements to each other," and quaintly concludes, "When ye societie's funds can afford it salaries shall be granted to the secretaries and other officers." In February 1791 Mr. Belknap writes: "We have now formed our society and it is dubbed, not the Antiquarian, but the Historical Society. It consists at present of only 8, and is limited to 25. We intend to be an active, not a passive, literary body; not to be waiting like a bed of oysters for the tide (of communication) to flow in upon us, but to seek and find, to preserve and communicate literary intelligence, especially in the historical way." In 1794 the membership was increased to 60, and by act of legislature in 1857, the limit of resident members was placed at 100. Associated with Jeremy Belknap in the new society were Rev. John Eliot, Rev. James Freeman, James Sullivan (later governor of Massachusetts), Rev. Peter Thatcher, William Tudor, the noted lawyer, Thomas Wallcut, the antiquary, James Winthrop, for years librarian of Harvard, Dr. William Baylies, a physician of Dighton, and George R. Minot, the author. The position held to-day by the Massachusetts Historical Society is so well recognized at home and abroad that it would be futile to attempt to describe either its valuable contributions or its stimulating example to similar societies, during its unqualified success of over 100 years. Its

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officers in 1903, were: President, Charles Francis Adams; vice-presidents, Samuel Abbott Green, M.D., Thomas Jefferson Coolidge; recording secretary, Edward James Young; corresponding secretary, Henry Williamson Haynes; treasurer, Charles Card Smith; librarian, Samuel Abbott Green, M.D.; cabinet-keeper, Henry Fitch Jenks.

To John Pintard is due the credit for the first meeting, 20 Nov. 1804, of the New York Historical Society. Those present included John Pintard, Judge Egbert Benson, DeWitt Clinton, Rev. Wm. Linn, Rev. Samuel Miller, Dr. David Hosack, Rev. John M. Mason, Rev. John N. Abeel, Samuel Bayard, Peter G. Stuyvesant and Anthony Bleecker. These patriotic founders organized "for the purpose of discovering, procuring, and preserving whatever may relate to the natural, civil, literary, and ecclesiastical history of the United States in general, and of this State in particular." The valuable library of John Pintard was acquired in 1807, thus forming the nucleus of the 100,000 volumes owned by the society in 1903. The first gift from outside sources, recorded in the minutes of the Society, came in 1810, when 10 volumes of the publications of the Massachusetts Historical Society were presented. The society is now erecting a new home on Central Park West, 76th and 77th streets, where its thousand members may more adequately enjoy its collections; including the galleries of American portraits and old masters; the famous Egyptian collection of Dr. Henry Abbott, the Nineveh sculptures presented by James Lenox, the original Audubon water colors, together with countless original papers, engravings, prints, broadsides and relics of the Colonial and Revolutionary periods. Meetings are held the first Tuesday of each month, October to June inclusive, at which papers, dealing with American history, are read. The society established a fund for printing its proceedings and collections; 28 volumes have been issued since 1868, as follows:

Vol. I.—'The Continuation of Chalmers's Political Annals of the American Colonies' (1685-96); 'The Colden Letters on Smith's History of New York' (1759-60); 'Documents Relating to the Administration of Jacob Leisler' (1689-1769).

Vol. II.—'The Clarendon Papers, Relating to New York and New England' (1662-7); 'The Destruction of Schenectady' (1690); 'Montague's Arguments on Acts of New York Assembly' (1701); 'Colden's Letter on Smith's History of New York' (1759); 'Plowden's New Albion' (1632-50); 'Gardiner's History of East Hampton, New York' (1798); 'Collection of Evidence and Vindication of the Rights of New York to the New Hampshire Grants.'

Vol. III.—'Territorial Rights of New York Against the Government of New Hampshire,' a brief by James Duane; 'Old New York and Trinity Church' (1730-90); sermon by the Rev. Francis Makemie (1707).

Vol. IV., Vol. V., Vol. VI., Vol. VII.—'The Papers of Major-General Charles Lee' (1754-1811).

Vol. VIII.—'Letters of General Pattison, Commandant of New York City' (1779-80); 'Letters to General Lewis Morris' (1775-82).

Vol. IX., Vol. X.—'Official Letter-Books of Lieutenant-Governor Cadwalader Colden' (1760-75).

Vol. XI.—'Papers of Charles Thomson, Secretary of the Continental Congress' (1765-1816); 'Letters of Colonel Armand' (1777-91); 'Letters to Robert Morris' (1775-82).

Vol. XII.—'Trial of General Schuyler' (1778); 'Trial of General Robert Howe' (1781); 'Journal of Commissary Rainsford, Enlistment of Hessian Troops' (1776-78).

Vol. XIII.—'Trial of General St. Clair' (1778); 'Journal of Occurrences at Quebec' (1775-76); 'Case of William Atwood, Chief Justice of New York' (1703); 'Vesey's Sermon in Trinity Church, at the

Funeral of Lord Lovelace' (1709); 'Letter of Dominie Michaelius, First Minister in New Netherland' (1628); 'Records of the Court of Lieutenantcy, New York Militia' (1686-96).

Vol. XIV.—'Journals of the Engineer Officers, Colonel James and Captain John Montrossor, of Services in America' (1757-78).

Vol. XV.—'Journal of Lieutenant Von Krafft, of the Hessian Army' (1776-84); 'Letter-Book of Captain Alexander McDonald, of the Royal Highland Emigrants' (1775-79).

Vol. XVI., Vol. XVII.—'Papers of Lieutenant-Colonel Stephen Kemble, Adjutant-General of the British Army in America, Journals and Correspondence' (1775-89); 'General Orders of the British Army in America' (1775-8); 'Journals, Documents, and Correspondence of the Expedition to Nicaragua' (1780-1).

Vol. XVIII.—'The Burgher Right and Roll of Burghers of New Amsterdam' (1648-61); 'Roll of Freedom of New York City' (1675-1866); 'Register of Indentures of Apprentices of New York City' (1694-1708).

Vol. XIX, to XXIII.—'The Deane Papers, Correspondence, Official and Private, of Silas Deane' (1774-89).

Vol. XXIV.—'Muster Rolls of New York Provincial Troops' (1755-64).

Vol. XXV.—'Abstracts of Wills on File in the Surrogate's Office, City of New York' (1665-1707).

Vol. XXVI.—Same (1708-29), with Appendix.

Vol. XXVII.—Same (1730-44).

Vol. XXVIII.—Same (1744-).

The officers of the New York Society for 1903 are: President, Samuel Verplanck Hoffman; first vice-president, Frederic Wendell Jackson; second vice-president, Francis Robert Schell; foreign corresponding secretary, Archer Milton Huntington; domestic corresponding secretary, George Richard Schieffelin; recording secretary, Sydney Howard Carney, Jr., M.D.; treasurer, Charles Augustus Sherman; librarian, Robert Hendre Kelby.

Following in the steps of these two oldest societies hundreds of a similar character exist to-day. Indeed, hardly a city or county in each State of the Union but has had its own local historical society. A casual glance at a few local societies in Massachusetts and New York will give an idea of the spirit which prevails for the preservation of the historic past:

The American Antiquarian Society, Worcester, Mass., was incorporated 24 October 1812; this inland city being selected as less exposed to possible invasion from the sea, with the consequent loss of historical collections.

The Essex Historical Society, Salem, Mass., was originally started by Dr. Edward A. Holyoke, of Salem, and incorporated in 1821. Some 15 years later the Essex County Natural History Society was incorporated, and in 1848 both of these societies united, forming the Essex Institute. Of other societies in Massachusetts a few will suffice. The New England Historic Genealogical Society, Boston; The Quobog Historical Society, Brookfield; Historical Society, Nantucket; Old Residents' Association, Lowell; Old Colony Historical Society, Taunton; Pocumtuck Valley Memorial Association, Deerfield; The Pilgrim Society, Plymouth; The Rumford Historical Society, Woburn. Rehoboth, Waretown, Westborough, Weymouth, and Winchester have each local societies.

In New York State mention may be made of the Long Island Historical Society, Brooklyn; Suffolk County Historical Society, Sag Harbor; Oneida Historical Society, Utica; Onondaga Historical Association, Syracuse; Rochester Historical Society; Buffalo Historical Society; Westchester Historical Society, and Tarrytown Historical Society. In many States the various religious denominations have historical societies and there was organized recently the American Jewish Historical Society, New York.

The various organizations in the several States have assumed so much usefulness that there now exists an "American Historical Association," organized at Saratoga, N. Y., 10 Sept. 1884, incorporated by Act of Congress, approved 4 Jan. 1889, and reports annually to Congress through the Smithsonian Institution. The more recent

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patriotic societies, such as the Sons of the Revolution, Society of Colonial Wars, Mayflower Society, Daughters of the Revolution, Colonial Dames, and Huguenot Society, are largely indebted to the historical societies for their existence. Indeed, the Sons of the Revolution was formed in the hall of the New York Historical Society.

The following list of historical societies is arranged in alphabetical order of States, with the information furnished, in so far as replies have been received, from the secretaries of States, or officers of historical societies:

Alabama.—The Alabama Historical Society, organized 8 July 1850 at Tuscaloosa, Chancellor Alexander Bowie being first president. Incorporated by Act of the General Assembly 5 Feb. 1852. During Civil War all work was suspended, many documents being lost. 1874 revived by Dr. Joshua H. Foster, its first secretary. 10 Dec. 1898; The Alabama History Commission was created at Montgomery, Hon. Thomas M. Owen being secretary and treasurer.

Alaska.—Society of Alaska, Natural History and Ethnology, incorporated 11 April 1888 at Sitka, Alaska Historical Library and Museum incorporated 6 June 1900, at Sitka.

Arizona.—The Arizona Pioneer Historical Society, located at Tucson, was established some years ago.

Arkansas.—There are two historical societies in the State, both styled "Arkansas Historical Society," one at Little Rock, Fay Hempstead, secretary; the other at the University of Arkansas, Fayetteville, J. H. Reynolds, secretary.

California.—The California Historical Society, organized in 1886, San Francisco.

Colorado.—The State Historical and Natural History Society, Denver; incorporated 11 July 1879. Charles R. Dudley, secretary.

Connecticut.—The Connecticut Historical Society, Hartford, organized 1825; revived by the general assembly 1839; Albert C. Bates, secretary; New Haven Colony Historical Society, New Haven, 1862; New London County Historical Society, New London, 1870; Fairfield County Historical Society, Bridgeport, 1881; and the Middlesex County Historical Society, Middletown, 1902.

Delaware.—The Historical Society of Delaware, Wilmington, incorporated 1868; Hon. Chas. B. Lore, president; Wm. Hall Porter, recording secretary.

District of Columbia.—The Columbia Historical Society, organized 9 March 1894; Mrs. Mary Stevens Beall, recording secretary; and also the American Historical Society.

Georgia.—The Georgia Historical Society, Savannah; Hon. William Harden, secretary.

Idaho.—The Historical Society of the State of Idaho, Boise City; Hon. Wm. A. Goulden, secretary.

Illinois.—The Illinois State Historical Society, organized 30 June 1899. Local organizations in the State cooperate with the Society. The last legislature made the society a part of the Illinois State Historical Library, which library has heretofore issued publications of the society. Mrs. Jessie Palmer Webb, librarian of State Historical Library, and secretary and treasurer State Historical Society.

Indiana.—The Indiana Historical Society, organized 1830.

Iowa.—The State Historical Society of Iowa, Iowa City; organized 1857; present articles of incorporation date April 1892; F. E. Horack, secretary. The historical department of the State Library, Des Moines, should not be confused with this society.

Kansas.—The Kansas State Historical Society, Topeka; organized 14 Dec. 1875; Geo. W. Martin, secretary; "this library contains 24,424 books; 72,789 pamphlets; 25,926 volumes of newspapers; 25,977 manuscripts; 6,696 relics; 5,751 pictures; and 5,129 atlases and maps.

Kentucky.—The Kentucky Historical Society; organized 1839-40. The legislature donated rooms to the society 1879-80. In August 1902 it became a department of the State. Gov. J. C. W. Beckham, president; General Fayette Hewitt, first vice-president; W. W. Langmoor, second vice-president; Mrs. Jennie C. Morton, secretary and treasurer.

Louisiana.—The Louisiana Historical Society; organized 15 Jan. 1836; Judge Henry A. Bullard, president; reorganized 1846 with Judge F. X. Martin, president; incorporated 1847 and a new charter given 30 April 1877, transferring it from Baton Rouge to New Orleans. From 1860 to 1888 Judge Charles Gayarré, president, being succeeded by Judge W. W.

Howe. Since 1894 Prof. Alcée Fortier has been president.

Maine.—The Maine Historical Society, Portland; organized 1822; H. W. Bryant, recording secretary; The Bangor Historical Society, Bangor; The Kennebec Antiquarian Society, Augusta; York Institute, Saco; The Sagadahoc Historical Society, Bath; The Lincoln County Historical Society, Wiscasset; The Skowhegan Historical Society, Skowhegan; The Waterville Historical Society, Waterville; and The Eliot Historical Society, Eliot.

Maryland.—The Maryland Historical Society, Baltimore; Geo. W. McCreary, librarian; The Frederick County Historical Society, Frederick; The Harford County Historical Society, Belair, Dr. Archer, president.

Massachusetts.—See data previously given.

Michigan.—The Michigan Pioneer and Historical Society, Lansing; organized 22 April 1874; issues each year a volume of historical collections; Henry R. Pattengill, secretary.

Minnesota.—The Minnesota Historical Society, St. Paul, is the only society in that State.

Mississippi.—The Mississippi Historical Society; organized 1898; Dr. F. L. Riley, secretary; Dunbar Rowland is director of the department of archives and history of the State of Mississippi, Jackson. This department was created 26 Feb. 1902 and is under the auspices of the historical society.

Missouri.—The Missouri Historical Society, St. Louis; chartered in 1875; The State Historical Society, Columbia, in 1899.

Montana.—The Montana Historical Society, Helena; organized December 1864; incorporated February 1865 and is a part of the State Library; Miss Laura E. Hovey, secretary and librarian.

Nebraska.—The Nebraska State Historical Society, Lincoln.

New Hampshire.—The New Hampshire Historical Society, Concord.

New Jersey.—The New Jersey Historical Society, Newark; organized 1845; William Nelson, corresponding secretary; Bergen County Historical Society, Hackensack, 1902; New Brunswick Historical Club, New Brunswick, Hunterdon County Historical Society, Flemington; Salem County Historical Society, Salem; Princeton Historical Association, Princeton; Woodstown and Pilesgrove Historical Society, Woodstown.

New Mexico.—The Historical Society of New Mexico; incorporated 5 Feb. 1881; home office, Santa Fe.

New York.—See previous references.

North Carolina.—The Historical Society of North Carolina was chartered in 1833; rechartered 22 March 1875; Dr. K. P. Battle, department of history University of North Carolina, Chapel Hill, secretary; The North Carolina Literary and Historical Society, Raleigh; W. J. Peele, secretary; and The Trinity Historical Society, Durham; Dr. J. S. Bassett, secretary.

North Dakota.—The North Dakota Historical Society; incorporated 8 March 1895; Col. C. A. Lounsberry, secretary, Fargo.

Ohio.—The Ohio State Archaeological and Historical Society, Columbus; incorporated 13 March 1885, E. O. Randall, secretary. There are many local societies in Ohio: The Western Reserve Historical Society, Cleveland; The Fireland Historical Society, Norwalk; The Ohio Philosophical and Historical Society, Cincinnati; and others.

Oklahoma Territory.—The Oklahoma Historical Society, founded by the Oklahoma Press Association at Kingfisher, May 1893. By act of territorial legislature 21 Feb. 1895 it became trustee of the Territory "for the care, collection and preservation of all kinds of historical matter, and for the expending of any appropriation made by the Territory for such historical purposes, and located the society at the University building at Norman." In June 1901 the society accepted the offer of the entire upper floor of the Carnegie Library, Oklahoma City, pending the erection of a capitol building. Lincoln McKinlay, president; Sidney Clark, custodian.

Oregon.—The Oregon Historical Society, organized 17 December 1899; F. G. Young, secretary, University of Oregon.

Pennsylvania.—The Historical Society of Pennsylvania, Philadelphia; organized 1824; John W. Jordan, librarian; Bucks County Historical Society, Doylestown; Montgomery County Historical Society, Norristown; York County Historical Society, York; Lancaster County Historical Society, Lancaster; Wyoming Historical and Geological Society, Wilkes-Barre; Washington County Historical Society, Washington; Lebanon County Historical Society, Heilmann Dale; Chester County Historical Society, West Chester; Delaware County Historical Society, Chester; Berks County Historical Society, Reading; Tioga Point Historical Society,

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Athens; and the Presbyterian, Baptist, and Methodist Historical Societies, Philadelphia.

Rhode Island.—The Rhode Island Historical Society, Providence; founded in 1822; The Newport Historical Society, Newport, R. I.

South Carolina.—The South Carolina Historical Society, Charleston; organized 1855; Gen. Edward McCrady, president; A. S. Salley, Jr., secretary.

South Dakota.—The Department of History in the State of South Dakota; administered by the State Historical Society; was organized by act of legislature 21 Jan. 1903; located at Pierre; Doane Robinson, secretary.

Tennessee.—Tennessee Historical Society, Nashville; Robert T. Quarles, corresponding secretary.

Texas.—The Texas State Historical Society; organized 2 March 1897; Hon. John H. Reagan, Palestine, president.

Utah.—The State Historical Society of Utah; organized 31 Dec. 1897; Salt Lake City.

Vermont.—The Vermont Historical Society; organized 1838; Montpelier; Joseph A. Deboer, recording secretary.

Virginia.—The Virginia Historical Society, Richmond; organized 1831; William G. Stanard, corresponding secretary and librarian.

Washington.—The Washington State Historical Society, Tacoma; Hon. Ezra Meeker, president; E. N. Fuller, secretary.

West Virginia.—State Historical Society, Charleston.

Wisconsin.—The State Historical Society of Wisconsin, Madison; organized 1849; re-organized 1853, this latter date being considered the real date of organization.

Wyoming.—The Wyoming Historical Society; organized 1895; Robert Morris, secretary, Cheyenne.

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History is a record of events which have occurred among mankind; embracing an account of the rise and fall of nations, and other great mutations which have affected the political and social condition of the human race. In a more limited sense, history is a record of the progress of mankind in civilization; and, therefore, deals especially with those nations which have performed great achievements and exerted a commanding influence upon the fortunes of the human race.

History is generally divided into three great epochs—Ancient History, Mediæval History, and Modern History. Ancient History begins with the first appearance of historic records, and ends with the fall of the Western Roman Empire 476 A.D. Mediæval History, or the History of the Middle Ages, extends from the fall of Rome 476 A.D., to the discovery of America 1492 A.D. Modern History embraces the period from the discovery of America to the present time. Sometimes, however, the world's history is divided into only two great periods—Ancient and Modern; Ancient History embracing the whole period before the fall of Rome, 476 A.D., and Modern History comprising the entire period since that event.

The three sources of history are written records, architectural monuments and fragmentary remains. Several races of men have disappeared from the globe, leaving no records inscribed upon stone or parchment. The existence and character of these people can only be inferred from fragments of their weapons, ornaments and household utensils, found in their tombs or among the ruins of their habitations. Among these races were the Lake-dwellers of Switzerland; the prehistoric inhabitants of the Age of Stone and the Age of Bronze of the British Isles; the builders of the shell-mounds of Denmark and India; and the Mound-builders of the Mississippi Valley.

The discovery of monuments of great antiquity has aided vastly in ascertaining the date of ancient events. The Parian Marble, brought to England from Smyrna by the Earl of Arundel, contains a chronological arrangement of important events in Grecian history from the earliest period to 355 B.C. The Assyrian Canon, discovered by Sir Henry Rawlinson, the great English antiquarian, consists of a number of clay tablets, constructed during the reign of Sardanapâlus, and containing a complete plan of Assyrian chronology, verified by the record of a solar eclipse which must have occurred 15 June 763 B.C. The Fasti Capitolini, discovered at Rome, partly in 1547 and partly in 1817 and 1818, contains in fragmentary records a list of Roman magistrates and triumphs from the beginning of the Roman Republic to the close of the reign of Augustus. The Rosetta Stone, discovered by a French military engineer during Bonaparte's expedition to Egypt in 1798, contains inscriptions in the Greek and Egyptian languages, the deciphering of which has led to the discovery of a key to the meaning of the hieroglyphic inscriptions on the Egyptian monuments. The fragmentary writings of Sanchoniathon give us some light on Phœnician history; those of Berosus on Babylonia and Assyria; Manetho's lists of the 30 dynasties of Egyptian kings afford us valuable information; and the works of Herodotus, the "Father of History," have given us a graphic account of the ancient nations—their annals, manners, and customs, as well as a geographical description of the countries which they inhabited.

Herodotus was the first of Grecian historians. Other Greek writers of history were Thucydides, the great philosophic historian; Xenophon, the writer of charming historical romances; Ctesias; Diodorus Siculus; Polybius; and Plutarch, the charming biographer of antiquity. Ancient Rome produced Livy, Tacitus, Sallust, and Cornelius Nepos, who have given us the facts of Roman history. For the history of the ancient Hebrews we are indebted to the books of the Old Testament and the works of Josephus, the celebrated Jewish historian, who wrote a complete history of his countrymen in Greek. Among early Christian Church historians were the Roman Eusebius and the Anglo-Saxon, the Venerable Bede. The Frenchmen Comines and Froissart were celebrated chroniclers of the Middle Ages. The Italian Macchiavelli achieved fame by his historical writings. Among modern historians have been many who have acquired celebrity by their works. Such were the great trio of British historians—Hume, Gibbon, and Robertson, whose works have always been regarded as standards. England has produced many famous writers of history; such as Macaulay, Carlyle, Grote, Thirlwall, Froude, Lingard, Arnold, Allison, Freeman, Rawlinson, Green, Knight, Merivale, Milman, Hallam, and others. France produced Rollin, Voltaire, Thiers, Guizot, Sismondi, Mignet, Michelet, and the brothers Thierry. Germany has given the world a great ecclesiastical historian in the person of Mosheim; and a number of German historians have given the world the benefit of their scholarly researches, among whom we may mention Niebühr, Neander, Rotteck, Heeren, Schlosser, Mommsen, Curtius, and Leopold von Ranke. Among American historians the most renowned

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have been Hildreth, Prescott, Bancroft, Motley, Lossing, and Parkman.

The origin of nations has been involved in obscurity, which has only quite recently been removed by the diligent study and the patient research of modern European scholars. Investigation into the affinities of the various languages has given us some new knowledge upon this interesting and important subject. Comparing the languages of most of the modern European nations with those spoken by the ancient Romans, Greeks, Medes, and Persians, and Hindus, we observe that all these languages had a common origin, entirely different from those spoken by the ancient Chaldees, Assyrians, Phœnicians, Hebrews, Arabs, and Egyptians; these latter being related to each other, but not to those of the nations previously named. The former of these languages are called *Aryan*, the latter *Semitic* and *Hamitic*; while the Central Asian Tartar nomads have a language called *Turanian*.

The Aryan branch is called Japhetic, because it has been supposed to be descended from Japheth; while the Semitic branch is regarded as the posterity of Shem, and the Hamitic branch as the children of Ham. The name Aryan means "tiller of the soil"; wherein this race has differed from the Turanian, or nomadic races of Central Asia.

In the course of time nations became divided into civilized and uncivilized, as their intellectual development was furthered by talents and commerce, or retarded or cramped by dullness and by isolation from the rest of mankind. Uncivilized nations are either wild hordes under an absolute and despotic chief who wields unlimited power over his followers, or wandering nomadic tribes, guided by a leader, who, as father of the family, exercises the functions of lawgiver, governor, judge and high priest. Neither the wild hordes under their despotic chiefs, occupying the unknown regions of Africa (negroes), the steppes and lofty mountain ranges of Asia, the primeval forests of America (Indians), and the numerous islands of Oceania (Malays), nor the nomadic races with their patriarchal government, find any place in history.

The oldest civilizations were those found in the Tigris-Euphrates and Nile valleys, in the Hindu peninsula, and in the remote empire of China. The exact origin of the ancient nations and civilizations is lost in the dimness of their remote antiquity. These regions were richly endowed by nature with the resources necessary for sustaining a dense population; and the oldest historic empires accordingly took their rise in the rich alluvial lands watered by the Tigris and the Euphrates in southwestern Asia and by the Nile in northeastern Africa.

Historical Asia is southwestern Asia; where the great Hamitic and Semitic empires of Chaldæa, Assyria, and Babylonia successively flourished, in the Tigris-Euphrates valleys; where the Hebrews and the Phœnicians played their respective parts in the world's historic drama; and where the Aryan race finally came upon the scene in the appearance of the great Median and Medo-Persian empires and the Græco-Macedonian empire of Alexander the Great and his successors, followed by the Parthian, Eastern Roman, and new Persian empires; after which

the Semitic race again prevailed in the sudden rise of Mohammed's religion and the great empire founded by his successors; followed by the conquests of the Seljuk Turks from Tartary, the two centuries of warfare between Christendom and Islam for the possession of the Holy Land as represented in the Crusades, the terrible scourges of the conquering Mongol and Tartar hordes of Genghis Khan and Tamerlane; and, lastly, the rise of the now-decaying Mohammedan empires of the Ottoman Turks and the modern Persians.

Southern Europe was the seat of the greatest two nations of antiquity—the Greeks and the Romans—the former by their literature and philosophy and their political freedom, and the latter by their laws and political institutions influencing all future European nations. The other nations of ancient Europe were barbarians, many of whom were conquered and civilized by the Romans. The overflow of the Roman dominion in the 5th century after Christ entirely changed the current of European history by a redistribution of its population through the migrations and conquests of its vast hordes of northern barbarians, who 14 centuries ago laid the foundations of the great nations of modern Europe. America and Oceania were wholly unknown to the ancient inhabitants of the Old World, and have only occupied the field of history since their discovery and settlement by Europeans within the last four centuries.

The cradle of civilization—if not the cradle of the human race—was the fertile alluvial Tigris-Euphrates and Nile valleys, where, with the dawn of civilization, flourished the old Chaldæan and Egyptian empires—the most remote of historical states of antiquity. History begins with Egypt, the oldest of historical nations.

Asia is the birth-place of the great religions and the home of absolute despotism. The two great pantheistic religions—Brahmanism and Buddhism; also the great monotheistic religions—Judaism, Christianity, and Mohammedanism—arose in Asia; while Asiatic governments to-day are what they have been from time immemorial—absolute monarchies, or despotisms; no republic or constitutional monarchy ever having flourished on Asiatic soil.

Europe, on the contrary, inhabited by the progressive Aryan race, has carried political institutions to the highest state of development; civil, political, and religious liberty having had a steady growth. Asiatic civilization has been stationary, while European civilization has been progressive. The Asiatics are passive, submissive, given to contemplative ease and disinclined to active exertion. The Europeans are active, energetic, vigilant and aggressive. Europe has also colonized other portions of the globe; the greater part of the present populations of North and South America being the descendants of Europeans who settled in the New World, and drove away, or assimilated with, the aborigines; while Europeans have also settled in portions of Africa, Asia, and Oceania. The Asiatics, on the other hand, do not colonize.

History, Ancient. Objectively history is a succession of past events connected with one another as cause and effect; subjectively it is a record of such events as determined by the processes of investigation included in historical method. The history of mankind treats not so

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much of individuals as of the progress and decline of communities and states with especial reference to morality, religion, intelligence, social organization, economic condition, refinement and taste, government, and the peaceful and military relations of governments to one another (cf. Andrews, 'Institutes of General History,' p. 3). Strictly there are no periods; the life of mankind flows continuously, never wholly changing the direction of its current at any definite time. But for the convenience of study history is more or less arbitrarily divided into periods, during each of which the resultant of changes in the life of mankind, or of a particular part of it, is supposed to be a determinable movement of progress or decline which the historian takes as characteristic of the period.

The familiar division of general history into ancient, mediæval, and modern may be accepted as the most practical, though it is exceedingly difficult to define these long and complex ages. Most obvious is the geographical characteristic. Leaving out of account India and the farther East, which have contributed little to the progress of the rest of the world, ancient history has to do (1) with the fertile river-valleys adjoining the east end of the Mediterranean; (2) with the Mediterranean basin itself; for the few outlying countries which had a share in ancient history depended upon this area for their civilization. Or taking race and religion as the basis of division, we may define ancient history as the development of pagan, non-Germanic civilization; for with the thorough establishment of Christianity and the coming of the Germans the Middle Age begins. Although ancient history includes many nations and numberless movements of growth and decay, it shows nevertheless remarkable unity. From simple though diverse beginnings the various peoples of the area above defined developed into the one complex political and social organization known as the Roman empire; and when with the wreck of this system the ancient world passed away, there began under new conditions that fresh life of mankind which in its earlier stage we call mediæval and in its more mature growth modern.

History does not concern itself with ultimate origins; it begins with man in the lowest condition in which it actually finds him, and with the help of anthropology, archæology, and kindred sciences it traces his improvement from that point upward through the earlier known stages of his existence. The prehistoric age, which precedes contemporary written records, is taken into account in so far as, by furnishing relative beginnings, it affords an explanation of later developments. Even when the historian reaches the period of contemporary documents and literature, he continues to use all available auxiliary sciences, principally epigraphy, archæology, numismatics, philology, and geography. In testing the genuineness and the historical value of sources he makes use of critical principles which are becoming more and more definite and effective with the growth of historical method into a science.

Nowhere has source material accumulated so rapidly in recent years as in the Orient. As a result of continued explorations there our knowledge of Oriental life has been vastly increased, and the beginnings of Oriental history have been pushed much farther back into the

past. We are now able to study the Egyptians of the paleolithic age (cf. Petrie, 'History of Egypt' (4th ed. i. p. 5 ff), although no date can yet be assigned to that primitive culture, nor have yet been discovered all the links which connect it with the historic age. Beginning with the earliest appearance of written records in the Orient, we may divide ancient history into the following periods:

I. *The Dawn of Civilization; the old Egyptian Kingdom and the Chaldean and Syrian City-States, 5000-3000 B. C.*—Whether mankind first emerged from the Stone Age in the valley of the Nile or in that of the Tigris and Euphrates rivers is disputed, and the date of this event has not been even approximately determined. There can be no doubt, however, that early in the fifth millennium B.C. civilization in both these regions had reached a comparatively high development. People irrigated their fields, built cities, in which they lived under kings, and were acquainted with the elements of practical science as well as with the art of writing. The Egyptian alphabet of this period was hieroglyphic, the Chaldean cuneiform. Egypt achieved political unification under a monarch near the beginning of the period; Chaldea and Syria remained divided among rival city-states.

Through the most brilliant part of the period the Egyptian capital was Memphis, whose Pharaohs of the fourth dynasty (about 4000-3725 B.C.) constructed the great pyramids at Gizeh. This epoch is unique in the world's history for the bold attempt to surpass nature in the grandeur and strength of its buildings, which at the same time indicate the high centralization in the hands of the monarch. The people of Egypt, devoted to agriculture and the industrial arts, were peace-loving, submissive to authority, and intensely religious. Prominent among the Chaldean cities were Ur, Nippur, Agade (Accad), and Babylon, under independent kings who strove with one another for the mastery. In spite of their military occupation the people, like the Egyptians, engaged their best thought and energy in creating the elements of civilization. Among their early achievements were the science of astronomy, the calendar, and a system of weights and measures, which with some modifications afterward passed to Europe. Early in the fourth millennium Chaldean civilization began to affect Syria.

II. *The Middle Kingdom of Egypt; the Political Unification of Chaldea; the Neolithic and Æneolithic Ages in Greece, about 3000-2000 B. C.*—In the beginning of the period Thebes supplanted Memphis as the political centre of Egypt. The most brilliant dynasty was the twelfth (about 2775-2550 B.C.). The Pharaohs of this family with a firm hand controlled the feudal lords who since the sixth dynasty had been growing strong over all Egypt, and to whom most of the famous rock-graves of the period belong. The same dynasty conquered Ethiopia (Nubia), carried on a lively trade with Syria, and had commerce with countries as far west as Crete. They built splendid temples, and regulated the waters of the lower Nile by means of a great reservoir in the Fayûm. Their utilitarian works contrast strikingly with the grand though selfish idealism of the pyramid-builders. Meanwhile in Chaldea the strife among the cities continued till the whole country was unified under Babylon (2250 B.C.).

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In the industries both nations reached a high stage of technical skill. The Egyptians excelled in inlaid work, the Babylonians in the engraving of gems. The architecture was massive, the Chaldean in brick, the Egyptian in stone. The sculpture, too, though lacking grace, showed great strength. The literature was looked upon by after ages as classic. In government we find a centralized monarchy with a bureaucratic administration regulated by written law (cf. the Code of Hammurabi (q.v.), about 2250 B.C.). The family was monogamic, and society was definitely organized in classes. The prime motive power in life was religion, which, manipulated by the priests, was already reducing the activities of man to a system of conventions and thus putting an end to originality.

In the region about the Ægean Sea the period is represented by the first settlement at Troy, of neolithic culture (3000-2500 B.C.), and by the second or "burnt" city, which was æneolithic (2500-2000 B.C.). Crete, in communication with Egypt, seems to have taken the lead in the civilization of this region.

III. *The Earliest Empires and Their Struggles; the Beginnings of Assyria, Phœnicia, and the Hebrews; the Bronze Age in Greece, 2000-1000 B. C.*—After the twelfth dynasty Egypt weakened; from the beginning of the second millennium the Hyksos (q.v.) a barbarous people from Asia, controlled the lower Nile valley for several, possibly five, centuries. After their expulsion the Egyptians became a conquering people. The eighteenth dynasty (about 1600-1325 B.C.) extended their dominion on the south to the centre of Ethiopia and on the northeast to the Euphrates River. Cyprus and the "isles of the Great Sea" sent as tribute and gifts vases of Mycenaean manufacture.

Chaldea, ruled by Cossæan—Kassite—kings (1717-1140 B.C.), was not only unable to prevent these conquests, but even lost her hold upon Assyria, which now began a long winning struggle with Babylon for supremacy. Both countries courted the favor of the powerful Pharaohs. For the first time in history we have great states in relations of war and peace with one another—the beginning of diplomacy and "world-politics." Assyria (1125 B.C.) suddenly created an empire which extended northward to the sources of the two rivers and westward to the Mediterranean. She advanced beyond Egypt in the organization and administration of conquered countries, but her empire soon fell to pieces, partly from internal exhaustion and partly because of invasions from Arabia.

Before the rise of the Assyrian empire the Hittites had conquered eastern Asia Minor and had wrested northern Syria from Egypt; but their power was as speedily overthrown by swarms of invaders of unknown race from Asia Minor, who then made a fierce assault upon Egypt.

Before the end of the millennium the Phœnicians had planted many trading-stations on the islands and coasts of the Mediterranean and had created a "world-commerce." Sidon was at first the leading city, and afterward Tyre. Their civilization, with that of all Syria, was fundamentally Chaldean, affected to some extent by Egyptian commerce and conquest. About 1000 B.C. the Greeks adopted their phonetic alphabet.

Among the immigrants from Arabia into the civilized districts of Hither Asia were the Aramæans, who established themselves in northern Syria with their capital at Damascus, and the Hebrews, who conquered the country in southern Syria now known as Palestine (1150 B.C.). At first their government was a theocracy represented by prophets and "judges," but soon (about 1050 B.C.) they established a kingship.

In this period the creative energy of the Egyptians had exhausted itself. Life became artificial; wealth, flowing in from conquests, substituted magnificence for taste, and in the end enfeebled the national spirit. On account of the wars the military class came into great prominence; the king, more than before, became the proprietor of the state, and the priests gained control of the material as well as of the spiritual activities of the nation. In Hither Asia, also, artistic and industrial civilization suffered through the decline of Chaldea; for the Assyrian genius was chiefly political and military rather than artistic or intellectual. The Hebrews, however, were moving in the direction of monotheism, and Phœnicia was spreading Oriental civilization abroad over the Mediterranean lands.

Of enormous importance for history was the development of civilization in the Ægean region. The beginnings of the Bronze Age—proto-Mycenaean—are represented by the third, fourth, and fifth cities at Troy (2000-1500 B.C.), followed by the fully developed Mycenaean civilization, represented by the sixth city at Troy, by Tiryns, Mycenæ, and many other cities on the Greek peninsula, in Crete and the Ægean islands. Characteristic of the civilization are massive fortifications, large palaces, immense tombs, wonderfully skilful work in gold, in vase-making, gem-cutting, and inlaying with precious metals, also excessive ornamentation of apparel and effeminate luxury. Toward the close of the millennium this culture began rapidly to decline.

Parallel to this development in the Ægean, yet little affected by it, the Etruscans of central and northern Italy were creating a peculiar civilization,—less artistic and less grand than the Mycenaean,—which did not reach its height till the following millennium.

IV. *The Growth and Decline of the Syrian Kingdoms; the Rise of the Assyrian Empire; the Epic Age in Greece, 1000-700 B. C.*—Tyre, taking the place of Sidon, became the centre of the world's commerce. Under king David the Hebrews developed a great political power; but after the death of Solomon they split into two kingdoms, Judah and Israel. Damascus, which had belonged to the realm of David, again became the capital of an independent Aramæan kingdom. Near the end of the period, however, all Syria excepting Tyre fell under the Assyrian yoke. The people of Damascus (about 730 B.C.) and Israel (722 B.C.) were carried into captivity, and Judah became tributary. Babylon, too, was definitely conquered (728 B.C.). Egypt, again declining, divided into many small principalities, while Ethiopia rose to a power of the first importance. Her king conquered the Nile valley to its mouth in 728 B.C. But the greatest political event of the period was the rise of the Assyrian empire. Through persistent warfare carried on by a line of able

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kings for crushing frequent rebellion as well as for new conquests, the empire reached the height of glory, though not yet its widest extent, under Sargon (722-705 B.C.).

Great progress was made in civilization. The Hebrews, afflicted by Assyria, were purging themselves of polytheism, and under the lead of inspired prophets were learning to look upon Jehovah as the only God, almighty, pure, and jealous, who demanded of his worshippers not only ceremonial exactness but clean hearts and spiritual devotion. With the Assyrians, notwithstanding their strong religious nature, political motives were dominant. For strengthening their empire they adopted the plan (1) of recruiting their armies partly from conquered peoples, (2) of transplanting populations from one part of the empire to another, to break up local attachments and weaken the power of resistance, (3) of organizing some of the conquered countries into provinces ruled by Assyrian officials, though many were still left under their native rulers. In government and administration, accordingly, Assyria was at this time the most progressive of nations.

The centre of interest in the growth of civilization, however, shifted to the Ægean region, where in this age the Ionic Greeks produced the first European literature—the 'Iliad' (q.v.) and the 'Odyssey' (q.v.). Colonists in a strange country, the Ionians were not in a condition to cultivate the Mycenaean arts, but drew their subsistence from grazing, agriculture, and war. With a high degree of refinement, mixed with barbarity, they possessed remarkably virile, elastic minds. In contrast with the slavish Orientals, the Greeks, represented by the Ionians, were in spirit free. To them neither nature nor religion was terrible; their gods were intensely human, generally the helpers, never the implacable enemies of man. Combined with this intellectual liberty and boldness was a rare sense of fitness and proportion, manifested in the Homeric poems referred to above. In Greek manhood, virility, freedom, intelligence, and taste combined to produce a civilization which was already rapidly advancing beyond that of the Orient.

V. *The Fall of Assyria and the Rise of the Persian Empire; in Greece Colonial Expansion and the Awakening of a National Consciousness; the Struggle Between Asia and Europe, in which Greece Becomes the Centre of Interest in the World's Politics; in the Central Mediterranean Region the Political Growth of Carthage and Etruria; at Rome the Primitive Kingship and the Beginning of the Republic, 700-479 B. C.*—Early in the period Lydia became a conquering state, and reached the height of its imperial power under Croesus (560-546 B.C.), who ruled nearly all Asia Minor west of the Halys River. Egypt fell under the Assyrian power (664 B.C.); but soon throwing off the yoke, it enjoyed a long period of independence (645-525 B.C.). Before the loss of Egypt the Assyrian empire reached from Thebes on the Nile nearly to the Caspian Sea, and from the Persian Gulf nearly to the Black Sea—the greatest extent of country yet united under one ruler. In Nineveh, their new capital, the kings built magnificent palaces of brick, adorned with representations of their wars in sculptured reliefs. They established libraries, too, of Babylonian learning. But they had already ceased

to make political progress, and they failed to give their empire an organic unity, and to inspire the conquered nations with loyalty to the central government. Suddenly the empire was overthrown by a combination of the Babylonians and the Medes, who destroyed Nineveh in 606 B.C. With this event Assyria disappeared from history.

Two empires—the Median and the Babylonian—divided between them the Assyrian domain. The former lay in the north of Hither Asia, the latter in the south. Under Nebuchadnezzar (606-562 B.C.) Babylon became the largest and wealthiest city in the world, a brilliant seat of industry and commerce. He destroyed Jerusalem, carried Judah into captivity (586 B.C.), and conquered Tyre. Of the other empire the ruling people were the Medes, who inhabited the plateau between the Tigris Valley and the Caspian Sea. Their sway extended westward, on the north of Babylonia, to the Halys River, and southward over their Persian kinsmen. Both empires, however, were short-lived; in 550 B.C. Cyrus, an Elamitic prince, at the head of a Persian revolt, established himself master of the Median realm. This event made the empire Persian. After conquering Lydia (546 B.C.) and Babylon (538 B.C.), Cyrus proceeded to subdue the countries to the east and northeast of Persia; so that at his death (529 B.C.) his empire extended from the Ægean Sea to the Indus River, and from the Persian Gulf to the Jaxartes River—an area perhaps five or six times as great as that of the Assyrian empire. His son and successor Cambyses added Egypt (525 B.C.), and Darius, the following king (522-485 B.C.), completing an organization begun by Cyrus, divided the empire into twenty satrapies (provinces), each under a governor termed satrap. This magistrate, appointed by the king, exercised full military and civil authority over his province, subject to royal regulations and commands. Though checked by the continual presence of a royal secretary and by the occasional visits of the king's "eye" (inspector), the satrap enjoyed the splendor and nearly all the power of a sovereign. Darius also built roads throughout the empire, distributed the taxes equitably, and established a system of gold and silver coins. He annexed Thrace to his empire, and made an unsuccessful attempt to conquer Greece.

In the beginning of this period the Greeks were extending the sphere of their influence through colonization. About 750 B.C. they had begun to settle in southern Italy and Sicily; and for two centuries the movement of expansion continued, till their settlements extended from Naucratis, Egypt, to the Pillars of Hercules, and from the northern coast of the Black Sea to Libya. With colonial enterprise the industries and commerce kept full pace. They manufactured armor, artistic bronze-ware, and tastefully painted vases. From Lydia they learned the art of weaving and dyeing fine woollens as well as of coining money; from Egypt they derived the elements of astronomy, of surveying, and of the other practical sciences. Great intellectual progress took place; lyric poetry flourished in all parts of Greece—a kind of poetry which shows that the Greeks were actively thinking on all subjects suggested by their expanding environment. They made a

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beginning of geography, history, and philosophy. Thinking led to religious and moral progress; the Greeks began to exercise self-restraint and moderation in life. Their sympathies widened with their intelligence; they discovered that they were all of one blood, one speech, and one religion, and began to call themselves by the common name of Hellenes. They became aware, too, of the differences between themselves and foreigners, whom they termed "barbarians," and of their own superiority to all other races. Conflicts with foreigners made the Greeks feel that they ought to combine for mutual defense. In the preceding age (1000-700 B.C.) their whole country was divided among a multitude of small city-states, each under an independent king. While in the more progressive parts of the nation in the period now before us the government was rapidly developing from kingship through aristocracy, oligarchy or timocracy, and tyranny in the direction of democracy, a corresponding movement was going on toward political unity. The city of Sparta, after uniting by conquest Laconia, Messenia, and Cynuria in the strong military state of Lacedæmon, built up the Peloponnesian league with herself as leader. The basis of her superior military organization was the phalanx. Under the fear of Persian invasion this power expanded into an Hellenic league of all the loyal Greek states on the peninsula and on the neighboring islands. In Sicily a similar league grew up under Syracuse for defense against two formidable powers, Etruria and Carthage. The Etruscan dominion extended from the Alps to the vicinity of the present Naples, and probably included the then insignificant city of Rome, which after having been ruled from the earliest times by kings set up a republic in 509 B.C. The Etruscans, now at the height of their development, were equally powerful by land and sea. Even more formidable to the Greeks was Carthage, the greatest Phœnician colony, which united under its leadership all the other Phœnician settlements in the western Mediterranean region. By means of enormous wealth, accumulated through commerce, this city recruited a vast army of mercenaries, with which she hoped to overwhelm the western Greeks.

Checked by the growth of foreign powers, Greek colonial expansion came to an end about 550 B.C. Then the boundary of free Hellas on the east was pushed back by the Lydian and Persian conquests in Asia Minor. A revolt of the Ionians against Darius,—in which the insurgents were aided by the mother country,—precipitated between Asia and Europe a conflict destined to affect the whole future history of the world. An army sent into Greece by Darius, was beaten back by the Athenians at Marathon in 490 B.C. Ten years afterward, Xerxes, son and successor of Darius, led a vast host into Greece, hoping to overwhelm the free little country by the sheer force of numbers. But his fleet was shattered in the battle of Salamis (480 B.C.) and his army destroyed at Platæa by the forces of the Hellenic league (479 B.C.). Meantime at Himera, Sicily, the despot of Syracuse destroyed the invading mercenary army of Carthage (480 B.C.). The Greeks met with brilliant success both in the East and in the West: those of their race in Asia Minor were liberated; all were relieved from fear of foreigners; Greek

civilization was free to develop without the restraint of alien rule; Greece came out of the struggle strong, proud, self-conscious, ready for great achievements in peace and in war.

VI. *The Culmination and Decline of Greek Political Power and of Greek Civilization; the Hellenization of the Orient; the Unification of Italy Under Rome, 479-264 B. C.*—The splendid naval force which Athens furnished for the war, together with superior statesmanship, placed her at the head of a new league of maritime Greek states, known as the Delian Confederacy (organized 477 B.C.). Rivalry for the headship of Greece between democratic Athens and oligarchic Sparta led to the Peloponnesian war, which involved a great part of the Greek world (431-404 B.C.), and which ended in the establishment of Spartan supremacy (404-471) over eastern Greece, while nearly all western Greece was united under Syracuse. Oppression on the one hand, and on the other the love of the Greeks for city-autonomy, caused the downfall of both political powers. For a short time under Epaminondas (371-362 B.C.) Thebes attempted to take the place of Sparta, but in vain; the Greek state-system,—consisting of leagues and hegemonies of cities,—was rapidly crumbling. Meanwhile Macedon, a territorial state under King Philip, taking advantage of the political disunion and mutual jealousies of the city republics, began to encroach on free Hellas. After defeating the combined forces of Athens and Thebes at Chæronea (338 B.C.) he imposed his protectorate upon the Hellenic state-system. His son Alexander the Great in a series of brilliant campaigns (334-331 B.C.) conquered the Persian empire, and afterward extended its boundaries to the northeast and the east. His empire was the largest the world had known. Among his improvements was the specialization of administrative functions, financial, judicial, and military. When he died, the empire after a long struggle among his generals ultimately divided into three great states,—Egypt, Asia (the Seleucid empire), and Macedon, including Greece. To regain and preserve their liberty many of the cities of eastern Greece entered into two federal unions, the Ætolian and the Achæan. These institutions, though long known to the Greeks, came into favor too late to save them from the domination—not of Macedon but of Rome. The western Greeks, however, were first to meet their fate.

After adopting a Republican constitution Rome engaged with her neighbors in a long, desperate struggle for existence (509-431 B.C.). Then by securing the headship of Latium (431-406 B.C.) and by the conquest of Veii she became one of the strongest powers in Italy. A series of wars with the Latins, Samnites, and Italian Greeks (343-290 B.C.) gave her control of all Italy south of the Rubicon River. The success of the Romans was due to their improvement on the Greek phalanx, their strict discipline and obedience to authority, their laborious patience in fortifying acquired territory, and their liberality in the treatment of conquered peoples. The political system which in this period they gradually built up on the basis of Italian nationality recognized various gradations of rights and obligations among the communities of the system from the tributary subjection of the Gauls to the full Roman citizenship. Though

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partly federal, the system left to Rome absolute control of foreign and military affairs. At the close of the period (264 B.C.) Rome and Carthage were the great powers of the western Mediterranean; those of the East were Macedon, Egypt, and the Seleucid empire.

The century and a half (479-322 B.C.) following the Græco-Persian war was in some respects the most brilliant in the history of civilization. The tremendous energy roused in Greece by the war displayed itself under the guidance of taste and reason in every field of activity. A wave of independence, overthrowing tyrannies and oligarchies, established popular governments in many cities, and intensified the democracies already existing. In Periclean Athens, which depended economically upon the labor of slaves and tributes from dependent allies, the citizens enjoyed a more liberal education and a wider range of political and social privileges than have ever fallen to any other community known to history. In close relation with this political and social development architecture, sculpture, and literature reached ideal perfection. The fifth century produced the Attic drama (Æschylus, Sophocles, Euripides, and Aristophanes), the noblest historical writing (Herodotus and Thucydides), and the inimitable Parthenon and Erechtheum. But the Peloponnesian war exhausted the energy and resources of eastern Greece. The growing refinement and love of peace which characterized the following century is indicated by the fact that the inhabitants of the city-states shirked military service, so that war came largely into the hands of mercenaries drawn from the less cultured territorial states. Thought prevailed over action; and in art strength was to some extent sacrificed to beauty and finish. While poetry declined, oratory and philosophy reached the height of their development in Demosthenes, Plato, and Aristotle, who brought classic Greek literature to a close.

Following the conquests of Alexander, commerce, colonization, and administrative policy spread Hellenic civilization over the Orient. In the post-classic period (after 322 B.C.) Pergamum and Alexandria became the most famous seats of Hellenistic culture, which was distinguished for painstaking scholarship rather than for creative power. The West, too, was falling under Hellenic influence. Rome adopted from the Greeks not only the phalanx, but also various deities and religious ideas, the alphabet,—either directly or through the Etruscans,—and other rudiments of civilization. From the Etruscans chiefly came the impetus to the building of public works,—temples, sewers, roads, bridges, fortifications,—in which the Romans showed creative genius. But to the end of the period they paid little attention to learning; they were without literature and had few if any schools. A realistic, practical people, they were narrow and unamiable in private and business relations, but excellent warriors and citizens. Duty and Discipline were the great commandments to which the family and society, citizens and soldiers, yielded religious obedience. These heroic virtues were not the least important factor in the creation of their empire.

VII. *The Expansion of the Roman Power over the Mediterranean World; the Growth of Plutocracy and the Decline of the Republic, 264-27 B. C.*—The extension of the power of

Rome over the peninsula brought her into collision with Carthage, which had occupied nearly the whole of Sicily and was now threatening southern Italy. Not only did Rome feel bound to protect Italy, but her growing commercial class desired by conquest to extend its opportunities for trade and speculation. The First Punic War (264-241 B.C.) may be compared in character and importance with the recent war between the United States and Spain, which resulted in the occupation of the Philippine Islands by the former power. To meet the Carthaginians on their own element, Rome built a navy, and thus equipped herself for transmarine conquests. As a result of the war, Carthage surrendered Sicily to Rome in addition to paying a heavy indemnity. This island became the first Roman province (227 B.C.). Sardinia and Corsica, acquired soon after the war, were organized into a second province. Then by conquering the Gauls in the north of Italy (225-222 B.C.) the Romans extended their sway to the Alps. In the Second Punic War (218-201 B.C.) the Carthaginian Hannibal, one of the most eminent generals of all time, invaded Italy, defeated one Roman army after another, desolated the country, and came near wrecking the power of Rome. Her preservation was due to the wisdom of the senate, to the solidity of Roman character, and to the tie of common interests and of kindred blood which bound the Italians together against the alien intruder. This war of defense shows Rome at her best. Peace brought her two provinces in Spain and the destruction of her rival's navy. So greatly superior was now her strength that the conquest of the civilized world had become merely a question of a few years. In another series of successful wars (200-146 B.C.) she acquired Macedon, Greece, Asia Minor, and the country about Carthage. Corinth and Carthage were destroyed, and most of the acquired territory was organized into provinces. At this date (146 B.C.) Rome was the only great power in the entire Mediterranean basin. The further growth of her empire consisted mainly in the conversion of protected and dependent countries into provinces and an occasional conquest. To Pompey belongs the subjugation of Syria (65-62 B.C.), which alone remained of the Seleucid empire, and to Julius Cæsar the more important conquest of Gaul (58-50 B.C.). Egypt, long dependent, became a province in 30 B.C. The Roman empire, consisting of provinces and dependent allies, now included the whole circuit of the Mediterranean.

Some advantages came to the world from Roman rule: while in the East Græco-Oriental culture continued undisturbed, Latin civilization, which was falling more and more under Hellenic influence, gradually permeated the provinces of the West; throughout the empire the cities retained their own laws and self-administration under the government of their wealthy class; all parts but the frontiers enjoyed lasting peace. The evil effects of the system, however, soon began to outweigh its advantages. To secure a monopoly of commerce for themselves, the Romans restricted or even prohibited trade among the subject communities. Over all the empire they acquired vast estates, which they worked by slave labor, thus destroying everywhere the free peasantry. Their policy of farming the taxes was also unjust and oppressive.

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The governors, too, with rare exceptions made office a means of amassing fortunes. In these ways the administrative and capitalist classes recklessly exploited the provinces for their own profit. At the same time commercial restrictions and the competition of slave labor were ruining the farmers and business men of Italy, and a worthless, dangerous mob was growing up in the capital.

The early government of Rome by magistrates, senate, and assemblies, although admirably adapted to a small community, proved unequal to its new and complex functions. The assemblies, now becoming corrupt, were in the hands of magistrates, ministers of the senate, which as a whole was controlled by a small knot of members, the *curule ex-magistrates*. This inner circle formed in the beginning a nobility of merit; it saved the state from Hannibal and conquered the Mediterranean world. But it soon transformed itself into an hereditary caste, which, monopolizing the domestic and imperial offices, used them as a means of absorbing the wealth of the world. In brief the nobility degenerated into a corrupt, self-seeking plutocracy. As to the general condition of the world at this time it should be noted that the want of competition, such as exists among nations of approximately equal power, by reducing the vitality of mankind, stopped progress, and decay was already setting in. Thorough reform was needed even to postpone the collapse of ancient civilization.

The Gracchi sacrificed their lives in a vain attempt to regenerate the peasantry and to restore Italy to its old condition of economic health; at the same time they showed the enormous power of the plebeian tribunate for purposes of reform or revolution. Far preferable to government by the corrupt aristocracy or by the mob, which Gaius Gracchus organized, would be the strong rule of one man; and the task of creating in the army a solid foundation for a government of the kind was accomplished by Gaius Marius. After him the governor (*proconsul*) of a military province employed his position as a means of acquiring an army for political use; and the *proconsuls* became rivals for the mastery of Rome. Finally Gaius Julius Cæsar, an aristocrat by birth but a champion of the people, allying himself with the tribunes, overthrew the republic and created a virtual monarchy. By radical reform of the entire administration this great creative statesman arrested the decay of civilization and gave the institutions of the ancient world a new lease of life. The assassination of the monarch, far from restoring the republic, was followed by a war of succession, in which his grand-nephew Octavius — after 27 B.C. Augustus — won the imperial prize (31 B.C.).

VIII. *The Empire at Its Height, 27 B. C. — 180 A. D.* — Instead of recurring to the autocracy of Cæsar, Augustus hit upon a compromise between republic and monarchy (27 B.C.). The senate through its magistrates and promagistrates was still to govern Rome, Italy, and the peaceful provinces, while Augustus as holder of the military authority (*imperator*, hence emperor) was to rule directly the exposed and unquiet provinces and to exercise supervision even over those administered by the senate; the republic was to continue for Italy, the monarchy

was established for the subject countries. In Rome Augustus held the tribunician power, and was sometimes elected to republican offices; but his chief influence over the home government was exercised not through office but in the capacity of political "boss," — a position which the Romans dignified with the name of *princeps* (foremost citizen). The prince and the senate had not only their separate fields of administration but also separate treasuries and separate sets of officials. Augustus concealed the independent position of the prince; Tiberius brought the dyarchic antithesis into bold relief; the Claudian and Flavian princes, by gradual encroachment on the senatorial prerogatives, aimed to convert the dyarchy into a monarchy. As the senate declined, the officials of the prince, originally his friends and household servants, developed into an imperial bureaucracy. After the tyranny of Domitian the "Good Emperors" (96–180 A.D.), in reconciling the nobility to the principate, laid more firmly the constitutional basis of their power. The government may now be termed a monarchy, although some elements of the dyarchy remained, and though the senate, with its republican traditions, continued to be a material check upon the powers of the prince.

The emperors made few permanent conquests, — chiefly Britain and the Danubian provinces. Their fundamental task was to extend Latin civilization to the un-Hellenized parts of their dominion. In Africa west of Egypt, notwithstanding the survival of the Phœnician language in private life, Latin civilization took deep root. Spain and southern Gaul became perhaps even more thoroughly Latinized. Northern Gaul was less affected, and Britain still less, by the Romans, while the northern provinces east of Gaul varied greatly in their receptivity of Latin culture. The principal factor in the work of civilization was the city; in most of their European domains the Romans superseded the old tribal organization by the Italian municipal system, which gave the nations the refining and disciplining influence of comfortable homes, useful and artistic public works, schools, courts of justice, and local self-government. Each city was a centre from which Latin modes of life and Latin ideas radiated. Imperial rule cured most of the ills of republican administration. Abolishing the farming of direct taxes, it placed their collection in the hands of imperial officials, and distributed them on the basis of a careful census. The governors, now drawing their salaries from Rome, and deprived of their former unlimited opportunity for extortion, were held responsible to the emperor. The armies, placed under strict discipline and controlled by one will, no longer wasted the empire by civil wars. For the vast extent of the frontier the soldiers were few, and the burden of their support was light. The republic had looked upon the provinces as its estates; in the 2d century A.D. the emperor came to regard himself as the parent of the subject peoples, whom he was in duty bound to treat with love as well as with justice. Though oppression was not wholly eradicated, the imperial government was in a high degree efficient, just, and humane. The progress of civilization was followed by the extension of the Roman citizenship. The liberal policy of Claudius in bestowing it was continued by his successors, till shortly after the period

under discussion all freemen of the empire became Romans by the edict of Caracalla (212 A.D.).

In this period was tried the experiment of maintaining profound and lasting peace over the large area comprising the interior provinces. Prominent among the results was a material prosperity far greater than has ever blessed those countries in any other age. Another result was the development of the "feminine virtues." Men "became chaste, tender-hearted, loyal, religious, capable of infinite endurance in a good cause" (Seeley, 'Roman Imperialism'). They began to regard women as their equals, to treat children and slaves humanely, to show kindness even to animals, and in spite of gladiatorial contests, to abhor bloodshed. Morals, at their lowest ebb in the Rome of Nero, were rapidly purified by the coming in of the best families from the provinces, so that under the Good Emperors morality in the capital reached a high level. The spirit of the age expressed itself not only in the private and social virtues, but also in the Civil Law, which rested upon the principles of justice, kindliness, and equality among men.

The unimaginative Romans failed to produce a literature of the highest rank. In the late republic lived Lucretius, a poet of real genius, and Cicero, the versatile author of orations, philosophic works, and private correspondence. The Augustan age created the epic and rural poetry of Virgil, the 'Odes' and 'Satires' of Horace on social and moral topics, and Livy's stately history of the republic. The most splendid Latin writers of the age of the Good Emperors were the satirist Juvenal and Tacitus, the historian of the early empire. Among the most famous writers in the Greek language at this time were Pausanias, author of a 'Tour of Greece,' Appian, the historian, and Plutarch, the biographer of eminent men. Hellenism continued to be the chief liberalizing and refining force in the empire. Its highest intellectual product from Roman soil was Stoicism, which found its best expression in the writings and character of Marcus Aurelius.

IX. *From Limited Monarchy to Despotism; the Reorganization of Diocletian and Constantine; the Barbarian Invasions and the Decline of the Empire, 180-500 A. D.*—Writers generally agree in making the decline begin with the reign of Commodus (180-192 A.D.), though disintegrating forces had long been in operation and though for generations afterward the empire at times, as under Septimius Severus and Diocletian, showed great recuperative power. The century which intervened between the death of Marcus Aurelius and the accession of Diocletian (180-284 A.D.) we may regard as a period of revolution. The happiness of the Roman world under the Good Emperors had been chiefly due to the wisdom of a succession of rulers who were able to secure the good will of the senate and of the populace of Rome, the subordination of the pretorians and of the army, and the respect of surrounding nations. The weak, brutish Commodus allowed these nicely adjusted forces to conflict, and the result was civil war and anarchy. The revolution, sweeping away the influence of pretorians, populace, and senate, almost of Rome itself, brought new principles of government into play. The emperor was to be a despot of the Oriental type,—a God on

earth,—who surrounded himself with stately splendor, and governed through a complex bureaucracy. He appointed a colleague, and two Cæsars were named as heirs of the emperors, all four dignitaries being men of eminent military ability. The empire was reorganized in prefectures, dioceses, and provinces under appropriate magistrates. These arrangements chiefly the work of Diocletian (284-305 A.D.) and Constantine (sole emperor 324-337 A.D.) were in the main permanent. In making better use of the resources of the empire for the purposes of defense the new organization brought fresh strength, but rivalry between the emperors again caused civil wars with all their evil consequences. Under Constantine, who removed the capital to Byzantium, thereafter called Constantinople, the two imperial offices were again vested in one person, and were not definitely separated till the accession of Arcadius and Honorius, sons of Theodosius (395 A.D.). Even then the theory of a single empire ruled by two colleagues continued; and when in 476 A.D. Romulus "Augustulus" was deposed at Rome and the imperial trappings were sent to Constantinople, people understood merely that the collegial government had once more given way to monarchy.

Meanwhile from the heart outward through every limb the empire was falling to decay. The underlying cause, already referred to, was declining vitality, fundamentally due to lack of interest in the welfare of the state, of the community, of future generations. As the civilized part of the human race lost love of life and hope for the future, it began to die out. A related cause was slavery, which long before Marcus Aurelius had been destroying the free population; in his time the plague, and after him foreign and civil wars, continued to waste life, while the burden of taxation, always increasing, made life every day more wretched. The wealth of the empire flowed to the East in exchange for useless luxuries; and for want of gold and silver the coinage was debased; at the same time the cost of living became excessive. Then, too, the growing splendor of the imperial courts added to the burden. With their scant means many found it impossible to support families, and even the slaves grew fewer. In these conditions most of the lower population, free and slave, became hereditary serfs—*coloni*—bound to the soil and to the payment of fixed dues to their lords. But it was not only the poor who suffered. The municipalities had once enjoyed freedom in local affairs, each governed by a senate, whose members—*decuriones*—were the wealthier men of the community. Gradually the emperors encroached upon the liberty of these cities, till they had converted even the privileges of the senators into intolerable burdens. For as these officials were responsible for the taxes due from their districts, many of them, unable to wring the required amount from the poorer classes, were themselves reduced to poverty. Nevertheless they could in no way shirk their duty, but were held for life by an iron hand to the unenviable task of collecting and of paying oppressive taxes. Artisans and traders, too, were bound strictly to their hereditary vocations, in order that the government might be sure of the dues to which they were subject. In brief, society was forced into a rigid caste-like system, which crushed freedom and made the life of rich and poor, bond and free, almost

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equally wretched. As under these circumstances the population grew unwarlike, the government found it more and more necessary to make up the armies of Germans, who consequently settled in the empire in ever increasing numbers. Although they readily adopted Roman civilization, their independent spirit, out of harmony with the conditions above described, acted as a new disintegrating force. Another power, which while aiming to make the world over on its own model tended to destroy ancient ideas and institutions,—including the empire itself,—was Christianity. Rome, essentially polytheistic, always tolerated the religions of the nations which she conquered; in the adoption of their gods into her pantheon she found a means of political centralization. Judaism, however, she regarded with disfavor, and attempted to suppress Christianity. These exceptions to her policy of toleration were due to the irreconcilable conflict between monotheism and polytheism and to the leveling tendency of the Christian religion. The apostles of Christ taught that the gods of Rome were demons, that the worship of the emperor was sinful, that all men from the emperor to the slave were equal before God, that the heaping up of wealth was an abomination; in brief their religion seemed to the Romans subversive of all the principles on which the empire rested. But although Christianity and Germanism were disintegrating the empire, they were destined in combination to make the old world new. The estimate of their value as creative agencies belongs to the mediæval period.

In appearance more formidable than internal decay were the hostile nations outside the empire. In the 3d century the Germans, who had long been threatening, began to break through the northern frontier. The Franks flung themselves upon Gaul; the Goths occupied Dacia and crossed the Danube, to defeat and kill an emperor. In the East, too, a new danger appeared; on the ruins of the old Seleucid power had arisen the Parthian empire, which in the 3d century was supplanted by a new, vigorous Persian empire. The warlike Persian monarchs nearly made good their threat to drive the Romans from Asia.

Early in the 5th century the Germans began to establish their states within the empire,—the Visigothic kingdom in Gaul and Spain (415 A.D.), that of the Vandals in Africa, and of the Burgundians in the Rhone valley. About the middle of the century the Angles and Saxons began to overrun Britain; a little later the Franks, who long before had crossed the Rhine, began the conquest of Gaul (486 A.D.); and in 493 A.D. the Ostrogoths conquered Italy. Before the end of the century the western branch of the empire had fallen into the hands of Germanic chiefs, who while vaguely recognizing the emperor at Constantinople as their lord were in reality sovereign kings of the countries they ruled. Here ancient history ends; the interaction between Roman and German life under Christian influence is the subject of mediæval history.

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History, Mediæval. *Definition.*—Mediæval history may be most easily defined as the middle period between ancient and modern history. Some scholars have wished to do away with the term entirely, and to use only two divisions, ancient and modern. In fact, in Oriental history there is no mediæval period. But most students prefer to keep to the threefold division for European history. This is due largely to the fact that the mediæval period can be presented with greater unity than either ancient or modern.

Mediæval history began with the disintegration of the Roman Empire in the 5th century, the ruin of paganism, and the migrations. Without arguing the merits of the various dates which may be assigned for the end of the Middle Ages (q.v.), we shall here discuss the history to about 1500 A.D. During this period of

one thousand years, the most marked characteristic is the dominant influence of the Church. The most important peoples are the Germanic races, who emerged slowly from barbarism, and gradually assimilated some of the features of the Roman civilization. Based upon the ruins of the older rose a new civilization, which caused a radical transformation in political, social, and religious ideals.

Contrast Between Romans and Germans.—The Romans had a highly developed and very complex civilization. From their Greek subjects, they had acquired the knowledge of art, literature, science, and philosophy. Under the Roman peace, an active commerce had grown up throughout the empire, supplying to each province the products of all of the others. In law and administration the Romans had reached such excellence that we still imitate them. Moreover, Christianity had become the state religion.

The Germans were barbarians, having the virtues and vices of their savage state, and resembling, in many respects, the North American Indians. But they were a vigorous race, with a great capacity for learning. Some of them had been converted to Christianity before they entered the Roman Empire, but most of them were still pagans.

Migrations.—The Roman Empire had for centuries held the barbarians in check, by the prestige of its name, by the payment of tribute, or by the policy of exciting dissension among its enemies. This last is well summed up in the Roman proverb, *Divide et impera*, which may be paraphrased, "Cause divisions and strife among those whom you fear and thus rule over them." In the latter part of the 4th century, however, the terrors inspired by the advance of the Huns (q.v.) into Europe, the knowledge of the weakness of the Roman Empire, and their own desire for more fertile lands, caused the Visigoths (q.v.) to enter upon their great migration. Their example was followed by other German tribes, and the movement continued throughout the 5th and 6th centuries. By the year 600, all the European portion of the Western Empire, except a few positions in Italy, was held by the Germans.

During the period of the migrations, there was a great destruction of life and property. But the conquered inhabitants were neither exterminated nor driven out. The German invaders were relatively few in number, and, in many sections, they found unoccupied lands sufficient for their needs. The conquerors and the conquered lived in constant contact with one another, and the resultant civilization was partly Roman and partly German. See MIGRATIONS.

Fusion of the Two Civilizations.—The 7th and 8th centuries were the period of fusion. By the year 800, the terms *Roman* and *Barbarian* were no longer used. The inhabitants formed a single people, with a civilization much lower than the Roman but much higher than that of the Germans when the latter had entered the Empire. In this new composite civilization, the Roman influence was greater in language, mechanical arts, business arrangements, and municipal, intellectual, and ecclesiastical affairs. The German influence was greater in military matters and judicial procedure.

The fusion was practically completed by the

time of Charles the Great. He realized clearly the task of the Middle Ages, and did all in his power, on the one hand to retain all that was best of the older German customs, and, on the other hand, to introduce from Italy such Roman customs as his subjects were able to adopt. He did much to foster education, which followed Roman models. By his wars, he brought under his sword all of the German peoples.

The New Empire.—In 800, Charles's services received fitting recognition in his election as emperor of the Roman Empire. The idea of a Roman empire which embraced all Christians had never been lost. After 476, when Romulus Augustulus was deposed by Odoacer, the people in the West, Germans and Romans alike, had regarded the emperor at Constantinople as the head of the Christian world. Even barbarians like Clovis (q.v.) had been proud to secure recognition and obtain a title from the emperor. The popes had looked to the emperors for support. In the last years of the 8th century, the East was ruled over by Irene (q.v.), who was both despised because she was a woman and for her crimes and heresy, so that it seemed to many that the imperial office was vacant. Consequently, Charles was crowned emperor and was considered the successor of Augustus, Trajan, and Constantine (qq.v.). Under his strong rule, the Western world was governed firmly, and the western nations were held together.

Disintegration of the Empire.—After Charles's death, his son was unequal to the task of ruling the empire. Under the combined effects of civil strife and constant invasions by the Northmen, the Mohammedans, and the Slavs (qq.v.), the central power was weakened, and the last Carolingian rulers were unable to protect their subjects. The whole frontier was exposed to attacks and the raids of the enemy even extended far into the interior. In each district the strongest man came to be regarded as the natural leader and protector. Sometimes it was a royal official, holding a fortification; sometimes it was an abbot or a bishop; at other times, a bold adventurer, who usurped authority. In the absence of a strong central government, each leader had to police his land and administer justice. Naturally, he demanded to be paid for his services, and exacted tribute from all under his control.

Because of the lack of money, the Carolingians (see CARLOVINGIANS) had always furnished to their counts and other official estates from which they obtained their living. Under the weak kings, the temporary grants of both land and office became hereditary, with or without the rulers' consent. The rulers, however, soon recognized the necessity of allowing this, and sought merely the recognition of their own overlordship and ultimate ownership of the lands. Consequently, they granted the benefices to the heirs and conferred, in addition, the immunity, or right of independent jurisdiction. Thus almost all land and power came to be held feudally. See FEUDALISM.

Feudal Anarchy.—There was constant warfare as each strong lord sought to obtain greater power or a more independent position. On the other hand, each king or suzerain tried to increase his own feudal holdings by conquest or marriage. Every vassal was anxious to avoid

all the feudal services that he could, and, at the same time, to exact as much as possible from the people subject to him. Commerce was burdened with excessive tolls in each fief and exposed to the depredations of the robber barons. Little attention was paid to maintaining roads and bridges, consequently travel was difficult as well as dangerous. As a whole, the feudal régime tended to isolate each fief and to reduce the peasantry to misery. It is significant that the term "Dark Ages," formerly applied to the whole of the Middle Ages, is often used now for the 9th and 10th centuries.

The Church.—The great cohesive and educating force was the Church. Soon after they entered the Roman Empire, each tribe of Germans had been converted to Christianity. In every barbarian kingdom the bishops were important officials. They often obtained great wealth, and ruled over vast estates. On their possessions, the serfs were treated somewhat better than on the lay fiefs. Monasteries had been founded throughout Western Europe, and often these served both as schools and as model farms. Boniface did much to bring the tribes of Germany into direct connection with Rome, and he held frequent church councils at which the clergy and nobles of a whole district came together. These councils were very important for their effect in unifying the Church and making its work more effective.

From this time the Church gained steadily in power and influence. Charles the Great did much to increase its wealth by enforcing the payment of tithes. He insisted that the clergy should be better educated themselves and should do more for the education of the people. In the 9th century the growing power of the papacy and the weakness of the kings enabled the popes to bring the bishops more directly under their own control. Thus the clergy of Western Christendom were brought into intimate association with Rome. Latin was the common language of all churchmen. Their feeling of membership in the Church was frequently stronger than any local attachment. Consequently the more able men were equally at home in every country and the Church had a greater unity than any lay power. This all-pervasive Church was the great unifying element amid the divisions of the feudal period.

Investiture Struggle.—After periods of weakness in the first half of the 10th and again in the first half of the 11th century, the Church at Rome was purified and strengthened by the support of the German emperors. About the middle of the 11th century, the strong personalities of Pope Leo IX. (q.v.) and of Hildebrand (later Gregory VII.) (q.v.) led to a great reform movement, and also to an effort to make the pope's power more effective. One feature of this movement was an attempt to secure entire control of appointment to church offices. This brought the papacy into conflict with the kings who considered that they had a right to nominate the bishops in their own kingdoms. The struggle was most acute between the German emperors and the popes, and resulted in the long investiture conflict, which was ended in 1122 by a compromise. See INVESTITURE.

Roman Empire of the German Nation.—But the investiture struggle was only a single phase in the relations between the empire and

the papacy (q.v.). In order to understand this it is necessary to study the fortunes of the empire after Charles the Great. Under his successors, the emperors had gradually lost their power, so that by the end of the 9th century, the title of *emperor* had become almost a meaningless designation, either conferred by a pope on anyone of whom he wished to make use, or else usurped by any ruler who chanced to be temporarily the strongest personality in Italian affairs. This continued to be the fate of the imperial title until Otto the Great (q.v.) was summoned to Italy, because of the discord reigning among the various Italian nobles. In 963 he was crowned emperor, and became the ruler of both Germany and Italy. Under his son and grandson, Otto II. and Otto III., "the Roman Empire of the German nation" was a very effective power in controlling both the imperial lands and the papal policy. After the death of Otto III. in 1002, the German rulers paid little attention to Italian affairs until 1046, when Henry III. was summoned to Rome because of the contest which was being waged between three rivals for the papal office. For 10 years he wielded a power similar to that of the Ottos. But at his death, as the heir was a young child, the reformed and strengthened papacy was able to assert its independence. When Henry reached manhood and desired to regain his father's power, the contest began and took the shape of the already mentioned investiture struggle. After the Concordat of Worms (q.v.) there was a truce which was broken by the accession of Frederick Barbarossa (q.v.), who was determined to be emperor in fact as well as in name.

Empire and Papacy.—On the other hand, the papacy was strong and was determined to assert its paramount authority. There ensued a struggle of one hundred years between the Hohenstaufen emperors and the popes. In spite of the ability of the rulers and the brilliancy of their reigns, the popes triumphed, largely by means of the assistance of the Lombard cities, which had grown rich and powerful and claimed to be independent of the imperial control. The death of Frederick II. in 1250 really marks the end of the mediæval empire, as a strong international power, although it continued, under a changed form, to be a factor in European politics for centuries longer, and came to a close only in the 19th century.

The Crusades.—The increasing power of the popes was also marked by their desire to extend their authority over the Eastern Church as well as the Western. This was in part the cause of the crusades, which were the most important manifestation of the strength and influence of the Church. The spirit of asceticism (q.v.) had long been inculcated as the most distinguishing mark of Christianity. The consciousness of their own sins and the teachings of the Church led many to do penance. One of the favorite forms, especially for heinous crimes, was a pilgrimage to some hallowed spot. The most difficult pilgrimage and the one to which greatest sanctity attached was the journey to Jerusalem. In the 11th century, one hundred and sixteen separate pilgrimages to Jerusalem are recorded, and, in some of these expeditions, hundreds and even thousands took part. Thus attention was directed to the Holy

Land. Moreover, in spite of the disorders of the feudal régime, the population was increasing, especially in France. The people were hard-pressed to get food, and were anxious for a change of any kind. Consequently, when the Emperor Alexius appealed for aid and Pope Urban II. preached the crusade at Clermont thousands took the cross. The movement spread rapidly and affected every country in Europe. Although Jerusalem was in the possession of the Christians for little more than a century, the crusades to the Holy Land, which continued for 200 years, produced great results. In order to understand these, it is necessary now to take up the Byzantine and Muslim civilizations. See **CRUSADES.**

Byzantine Civilization.—Until a half-century ago, the Byzantine history was misunderstood. It was looked upon as the long death struggle of a society in which all progress had ceased, and despotism, tempered by assassination, crushed out all vitality. Gibbon styled the history "a tedious and uniform tale of weakness and misery." It is known now that this was unjust. The most striking fact about the Byzantine Empire is its "constant vitality and power of recuperation." It was threatened by invaders, but it repelled them all. At times it lost some of its most fertile provinces, but at other periods it would rise triumphantly and recover its lost possessions. Throughout the period between 700 and 1100, Constantinople was the bulwark of Europe, against which the waves of invasions rolled in vain. In addition to being a bulwark, Constantinople was, throughout the Middle Ages, the great storehouse of the Greek and Roman civilizations, where it was preserved until the European nations were sufficiently advanced to profit by it. Constantinople (q.v.) was also the most important commercial centre of the Middle Ages. The city was marvelously wealthy and excited the admiration of every traveler. Most of the crusaders passed through Constantinople and the Greek lands on their way to Jerusalem; by them the influence of its civilization was widely spread throughout the West. See **BYZANTINE EMPIRE.**

Muslim Civilization.—No less important was the influence of the Mohammedans. After the death of the prophet in 632, his followers had conquered with wonderful rapidity the greater part of the civilized world. From Persia and India they held all Asia to the Hellespont. Egypt and the whole north coast of Africa, Spain, and about one third of Gaul, were under their sway within a century. Their advance in civilization was equally rapid. The Arabs had wonderful acquisitive ability and were taking almost the first step in their education. In each country they learned the arts and sciences known by the inhabitants, and they carried this knowledge wherever they ruled. The Greek philosophy, which they acquired from the peoples in the lands formerly under Greek sway, the mathematical knowledge of India, the irrigation practised in Egypt, are illustrations of their acquisitions, which enabled them in the 10th and 11th centuries, to develop a civilization far in advance of any other, with the exception of the Byzantine. From Bagdad to Spain this culture was spread throughout the Mussulman world. In Syria, the crusaders were in contact with this civilization for two cen-

turies. By their agency and by the association of Christians and Mussulmans in Spain, Sicily, and other points, much of the Muslim learning was conveyed to the Christians of Western Europe.

Changes in the 12th and 13th Centuries. Enrichment of Europe.—In addition to this fructifying intercourse with other civilizations, many elements in their own contributed to cause a rapid advance in the 12th and 13th centuries. Among these may be noted the increase in population, the cultivation of waste lands, the revival of commerce, the general progress along educational lines, and the rise of strong kingdoms. But as it is impossible to isolate each factor and to determine the part which it played, the results will be considered as a whole and the changes which took place in Western Europe after 1100 will be described.

The hundreds of thousands of crusaders had to procure large sums of money for their equipment and journey. Consequently the precious metals which had been hoarded came into circulation as money. Instruments of credit were devised and the money circulated rapidly. Contact with other civilizations gave birth to new tastes and these were gratified by means of a greatly increased commerce which extended to all parts of Europe and even to the extreme East. The merchants became numerous and prospered. Cities increased rapidly in population and new ones were founded. The Italian cities, because of their position, prospered the most of all. The merchants became an important class because of their wealth, and by the end of the 13th century became a political factor which was recognized by their inclusion in the new parliamentary bodies.

Intellectual Advance.—The investiture struggle had caused scholars to study history in order to find precedents in support of the imperial or the papal claims. The contact with other peoples broadened the intellectual horizon of the Western people. The new points of view with which they became acquainted led them to question the traditions which had ruled their lives. The new books, especially the works of Aristotle (q.v.), which fell into their hands, were studied eagerly. The new wealth gave leisure. Students flocked to the centres where teachers were to be found, and gradually universities arose. Roman law was fostered by the emperors; canon law, by the Church. Scientific knowledge, especially in medicine, was acquired from the Greek and the Arabic works. Gothic cathedrals of exquisite beauty were built in western Europe. The deeds of the crusaders furnished new material to literature. The old tales were re-worked and given a literary form.

Growth of Monastic Orders. Temporal Power of the Popes.—No less marked were the changes in the Church. At the close of the 11th century a great wave of asceticism spread over western Europe. The idea of sacrifice caused thousands to enter monasteries, and many new orders of monks were founded. These orders vied with one another in austerity and asceticism. Their reputation for sanctity and their services to the community brought to them great donations from the pious. Their knowledge enabled them to increase their wealth. But this wealth led many to enter the monasteries from unworthy motives, and thus caused a gradual

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decline in their lofty morals. The wealth of the Church, as a whole, caused many, both monks and laymen, to attack it as having departed from its Christian ideals. Heretics became numerous and had to be repressed by persecutions and the inquisition. In the 13th century the mendicant orders became prominent, partly as a protest against the wealth of the Church, and partly as an agency to combat heresy. The ideal of service to others for which they stood became dominant in monasticism, and later orders were founded, almost universally, for some special service. See **MONACHISM**; **ORDERS, RELIGIOUS**.

The papacy, engaged in a struggle with the monarchs, felt the need of temporal power and strove for it. Innocent III. had monarchs as his vassals, and wielded a temporal authority greater than that of any previous pope. After the popes had triumphed over the Hohenstaufens they seemed to have achieved success. Their struggle with the French king, at the beginning of the 14th century, however, led to defeat and to the "Babylonian captivity" at Avignon. Then ensued the schism and the conciliar period when many felt that the general councils and not the popes should be supreme. Finally the papacy emerged triumphant, but with a changed ideal, laying less stress upon temporal power (q.v.) than upon control over the conscience of the individual.

Chivalry. Decadence of the Knights.—In the 12th century, the clergy and the knights formed the aristocracy. The latter, too, had their period of great splendor. The ideals of chivalry, which became prominent in the 12th century, were inculcated by the Church, and the knights were often likened to the clergy as a class specially set apart by their religious vows. These ideals were also inculcated by the new literature, which glorified not only bravery and loyalty, but also generosity and luxury. The latter led to the ruin of many of the knights. Their income, arising from feudal dues, was relatively fixed. As their tastes expanded and they expended more upon luxuries, they fell into debt. The rate of interest was ruinous and they were unable to pay. Consequently many were compelled to alienate their fiefs, the monarchs and other lords of large fiefs absorbed the lesser fiefs, and there was a tendency for the knights to become retainers of the more wealthy. Their consequence as a class declined in comparison with the growing importance of the merchants. The development of strong infantry forces finally deprived them of their pre-eminence in military matters. See **CHIVALRY**.

Rise of the Nations.—The contact with other peoples led to the rise of a national consciousness. In the earlier days, when each feudal castle or village was practically isolated and often at strife with its neighbors, there had been little feeling of common interests. Association with foreigners brought a sense of national feeling in opposition to the foreigners. This is very marked in the armies of the second and third crusades. This movement was coincident with, and one cause of, the growth of the strong monarchies. The merchant class was also an important element in the development of the king's powers. Commerce was heavily burdened with feudal tolls and exposed to depredations by the knights. The merchants sought

privileges and protection from the kings. In return they furnished them money, which aided them in extending their power at the expense of that of their nobles. The kings came to depend largely upon the cities for support in all struggles with the nobles. By their wealth the citizens were able to rival the nobles in luxury and ostentation. The sons of the merchants frequented the universities and developed into officials of the kings. More and more the kings came to depend upon the third estate and to withdraw power from the nobles.

The French Monarchy.—The development of the monarchical power took different forms in the several countries, but took place about the same time in the leading nations. In France, the Capetian kings (see **CAPET**) had at first little power. They had only a small territory directly under their control, and consequently only a small income. But by fortunate marriages and by confiscations they enlarged their feudal domains. Several of the kings had long reigns and the evils of a minority or a change of dynasty were avoided. Gradually all the fiefs were brought under the control of the king, and feudal usages were made the basis for the assertion of a really monarchical power. Under Saint Louis (1226-1270) and his successors France was centralized and the kings became supreme. The prosperity of France was checked for a time by the Hundred Years' war (1328-1461). This was due in part to a failure of male heirs in the direct line, which enabled the English kings to make a claim to the throne on the ground that they were the most direct heirs. But France finally emerged triumphant and England lost all her territory in France. The kings, supported by the third estate, became practically absolute.

The English Monarchy.—In England the Norman Conquest (q.v.) made William supreme lord. Following the Norman feudal usages, he insisted upon an oath from each one of his subjects, and did not allow the intervention of the feudal nobles. In spite of the civil wars of the 12th century, Henry II. was able to retain the supreme control. The tyranny and incompetence of John led to a revolt on the part of the barons and the extortion from him of the Great Charter. (See **ENGLAND—Civil History**.) The efforts of the kings to evade the provisions of the charter caused the union of the nobles and third estate, the distinctive feature of the English constitution as contrasted with that of France or of Germany. The loss of its continental possessions really strengthened England and enabled it to develop a strong government in its own island.

The German Monarchy.—Germany was a kingdom made up of great duchies. The king was strong only when he had all these duchies under his immediate control. The imperial title which he held was usually a source of weakness, because of the necessity of maintaining his authority outside of Germany. Those kings who neglected the imperial interests in Italy and Burgundy were strongest at home. Frederick Barbarossa, Henry VI., and Frederick II. (qq.v.), who attempted to build up strong empires, were compelled, as the price of support from their German subjects, to make constant concessions. Thus they bartered away most of their German lands and royal rights. The towns

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and cities, in particular, acquired privileges and practical independence in payment for their support in men and money. On the extinction of the Hohenstaufen house, Germany was divided up into many separate entities, varying in size from a duchy to a village or to a knight's fee, all claiming independence of all control except the imperial. The weak emperors of the 14th and 15th centuries were unable to maintain any effective control or order. Each emperor was intent only upon retaining his position and securing such property for his family as he could. Consequently Germany became a prey to internal dissension and division.

The Other Monarchies.—The other countries were more backward. In Spain, the Christian kings were engaged in conquering Muslim territory or else in warring with one another. These movements were going on for several centuries, and culminated just at the close of the Middle Ages. In 1492, the Moors were conquered in Granada, their last stronghold. The two most powerful kingdoms, Castile and Leon, had already been united, and 20 years later the Spanish portion of Navarre was added. In Scandinavia powerful monarchies were growing up. In the eastern portions of Europe new Christian kingdoms had arisen, especially Russia and Hungary, which were destined to play an important role in the later centuries.

The Period of the Renaissance: Discoveries.—The last period of the Middle Ages is often spoken of as the Age of the Renaissance (q.v.). The name is to a certain extent a misnomer. But it is sanctioned by general usage, and there are certain factors that may be brought together, which serve to mark the transition from the mediæval to the modern world.

The travel and commerce of the 12th and 13th centuries caused an interest in foreign lands which never abated. In particular, the taste for spices, which had become common, led to attempts to secure these more easily and more cheaply. After the loss of the Christian possessions in Syria, the importation of spices into Europe was burdened with heavy tolls by the Muslim rulers through whose territories they had to be carried. To the men of the 15th century there seemed to be two possible routes by sea to the spice islands, one by sailing around Africa, the other by sailing directly west to India. Attempting the latter led to the discovery of America; attempting the former, to the doubling of the Cape of Good Hope. The result of these discoveries was to make the nations on the ocean the leaders in commerce. The Mediterranean ceased to be the centre of the world's commerce and the Italian cities lost their pre-eminence as commercial centres.

Inventions: Compass, Printing-press, Gunpowder.—This exploration was possible only by the use of the compass (q.v.). This had been known in the West by the 12th century; in the East, centuries earlier. But it was perfected as a real aid to navigation only in the 14th century. About the middle of the 15th century came an even more important invention, that of printing (q.v.). This resulted at once in increasing enormously the number of books in existence and in cheapening their cost to one fifth or less, so that books were readily accessible to a much larger number than before. At about the same time the manufacture of gunpowder was being per-

fectured. Compositions similar to gunpowder (q.v.) had long been known in the East, and the knowledge of the composition of "Greek fire" had been brought to the West. But it came into general use only in the 15th century, and the guns long after that were held by many to be inferior to the cross-bow. But gunpowder, before 1500, was revolutionizing the art of war and rendering the mediæval knight obsolete.

Classical Literature and Pagan Spirit.—Contemporary with these discoveries and inventions was the awakening of an interest in classical literature. In the 12th century there has been at some centres an eager study of the Latin classics, but, in the 13th, this had been superseded to a great extent by the branches considered more practical, especially law, mathematics, and science. In the 14th and 15th centuries men turned again to the classics, and Greek, which had long been neglected, became a favorite study. Along with the study of the pagan authors developed a new feeling for art, which resulted in the wonderfully natural works of the Renaissance artists. Other sides of this new activity were manifested in the more scholarly spirit of criticism and in scientific study. In fact, with the period of the Renaissance modern history had dawned.

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'Syllabus of Mediæval History' (3d ed., 1903), contains references by topics to about 250 works, mainly in English.

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History, Modern.—General Characteristics.

—When History is divided merely into Ancient and Modern, the term Modern applies to history subsequent to the 4th century A.D. The *Americana*, however, keeps to the more usual triple division into Ancient, Mediæval, and Modern; and with this classification Modern History begins about the year 1500.

At that date, as for several centuries preceding it, the scene of human progress was confined to Western Europe, and the actors were the Latin and Teutonic peoples. Nations, in the proper sense, were not made; and the political map bore faint resemblance to that of to-day. There was one Latin Christendom, binding in feeble union the several geographic units. But most of the units themselves were broken into fragments under local rulers; and these fragments, sometimes of widely separated lands, were recombined, with kaleidoscopic confusion, in loose, shifting aggregates which possessed not even permanent names. Out of this feudal chaos, strong monarchies were just emerging, to organize states, in France, England, and Spain; but there was hardly a prophecy of a Germany or an Italy. Except for Poland with its Latin church and borrowed German culture, Eastern Europe was outside the pale of civilization. The barbarous northern Slavs seemed doomed to Tartar domination, and the somewhat less barbarous southern Slavs with the neighboring Magyars were enslaved by the Turk. From the devouring victorious march of the Turk even Central Europe was in imminent peril.

This dismal political picture had its counterpart in social and economic conditions. Society was hopelessly aristocratic and predominantly militant, and it was crystallized in strata. The skilled industry of the towns was managed upon the guild system; and agricultural labor, except in England and some other small districts, was carried on by serfs.

But Europe had been astir with dim impulses to change for four hundred years,—ever since the Crusades broke the torpor of the Dark Ages and prepared the way for the rise of towns and the Renaissance. Near the close of the 15th century the tendency to progress became more pronounced, and the lines of activity more varied. Louis XI. in France, the Tudors in England, Ferdinand and Isabella in Spain, prepared the way for new consolidated political societies, and for new principles of government; the invention of printing made possible the preservation and utilization of the recently rediscovered Greek learning and the rapid dissemination of new ideas; the discoveries of Columbus and Vasco da Gama set free undreamed-of energies among the lands of the Atlantic seaboard, and summoned commercial Europe to a right-about from east to west; the adoption of gunpowder in the wars between Francis I. and Charles V. marked the passing of the military superiority of the knight in armor, and undermined the citadel of aristocracy in politics; the opening of the Protestant Reformation (1520) shattered the old unity of Christendom, and, to-

gether with the Catholic Counter-Reformation, called out new energies in the fields of morals and intellect. Within two generations, the one just before and the one just after the year 1500, there stood revealed not merely a new physical hemisphere and new continents in the old one, but also a new universe of thought and feeling. Europe had passed into a new age.

The four centuries of Modern History have been a period of constant, marvelous, increasingly rapid transformation,—intellectual, political, industrial. The stage itself has widened from a corner of the smallest continent into wellnigh the whole surface of the globe. The actors have multiplied, until they promise in the near future to include all branches of the human race. The drama has become infinitely complex, with the interaction of countless streams of influence. As compared with Ancient or Mediæval History, Modern History deals with a brief time, but with vast spaces, complex relations, and accelerated progress. The separate movements that make up the bewildering maze are discussed severally in some detail, under appropriate headings, in the *Americana*. This article attempts only to marshal them in such order as to bring out the essential relations between them.

It is convenient to divide the four centuries of Modern History into the *age of monarchic states* and the *age of nation-states*. The American and French Revolutions make the transition from one to the other, and the most satisfactory dividing date is 1789.

FROM THE REFORMATION TO THE FRENCH REVOLUTION.—*Monarchic States*.—The constant warfare of the 16th, 17th, and 18th centuries is the simplest thread by which to connect the other movements of the age. Speaking broadly, the contests of the first half of the period, to 1648, are "religious wars," Catholic against Protestant, while after 1648 the struggles grow out of dynastic and commercial rivalries.

The declaration of the war which split Christendom into opposing camps for over a century came in 1520, when Luther burned the Pope's bull. The Diet of Worms at once pronounced against the rash monk the ban of the Empire; and the decree would have been enforced, and Protestantism stifled at its birth, if the young Emperor, Charles V., had had a free hand. But Charles had just become involved in strife with Francis I., over the claims of Spain and France in Italy, and he was kept busy with war against France and the Turks until 1544. For a generation, therefore, the new faith was left to spread itself unchecked over Germany and Scandinavia, while during the same period the English church cut itself off from Rome, and Presbyterian heresy made headway in France and Switzerland. For a time, indeed, Protestantism threatened to conquer even the south of Europe; but the Catholic Counter-Reformation, with equal zeal and superior skill, finally saved the Romance lands to the old faith.

Religious Wars, 1516-1648.—Meanwhile, entangled in his strife for European sovereignty, Charles could not strike at Protestants in Germany until 1546. It was then too late. In 1555, after brief struggles, the princes of the Schmalkald League forced upon him the Peace of Augsburg; and, though troubled with incessant bickerings, Germany had no further civil war for sixty years. Just that period, how-

ever, was filled with terrible religious contests in the Netherlands and France; and then the age of religious wars closed with another civil war in Germany,—the most destructive in European history. The century of strife from the opening of the Schmalkald War to the close of the Thirty Years' War (1546-1648) did not materially alter religious frontiers. Catholicism, to be sure, made some conquests with the sword,—Bohemia, South Germany, and the southern Netherlands,—but in most of these districts, as in the Latin countries of Southern Europe, the Counter-Reformation was making rapid gains before war began.

The close of the period of religious war is marked by the decay of Spain, the continued disruption of the Holy Roman Empire, and the rise of France and of the Dutch Republic. To explain these changes it is useful to dwell somewhat further upon the wars.

In 1556-7, after his failure in Germany, Charles V. resigned his crowns,—the Austrian possessions passing to his brother, and the Spanish to his son, Philip II. Despite the division, Philip was far the most powerful monarch in the world. Each year the "gold fleet" filled his coffers from the exhaustless wealth of the Americas, and in 1580 Portugal with her East India empire fell into his hands. This was the power,—supreme in Europe and sole mistress of the New Worlds east and west,—against which the petty, disunited Netherland provinces dared to rebel. Beginning as a political revolt in 1568, the struggle soon became a religious war; and it was waged for more than forty years with a relentless fury which made it a byword for ferocity even in that brutal age. The ten southern provinces finally returned to Spanish allegiance; but the northern provinces,—Dutch in blood and Protestant in religion,—fought on with desperate courage until they won independence. At the same time they preserved political and religious liberty for the world. Midway in the struggle, Elizabeth of England sent some tardy aid. Philip then turned upon England; but the destruction of his "Invincible Armada" in the splendid sea-fight in the Channel not only saved England at home but also paved the way for the English colonization of North America. The war closed in 1609. Spain had sunk into a second-rate power, never again to play an important part in European politics; but the United Provinces, through the stage of the desolating war, had grown prosperous. They drew wealth, not from the wasted land, but from the sea, plundering the new possessions of Spain in the East Indies and building there a colonial empire for themselves. For most of the century, in intellectual, commercial, and industrial activities, the Dutch held the first place in Europe.

In France the Edict of Nantes (1598) closed the wars of religion by guaranteeing toleration and handing over certain garrisoned towns to the Huguenots as security. During the next half century, under the wise administration of Henry IV. and then of Richelieu, the industry of the people restored prosperity with marvelous rapidity. Richelieu crushed the feudal nobles and recaptured from the Huguenots their garrisoned towns. In other respects, however, he kept toward the Protestants the pledges of the Edict of Nantes; and as he warred upon

the Protestants within France in order to strengthen the royal power, so he aided the Protestants of Germany in the Thirty Years' War in order to make France supreme in Europe. France had long been in real peril from the Hapsburg powers of Spain and Austria, which ringed her about in hostile embrace; but the failure of Spain against Holland and Richelieu's policy of weakening Austria in the German war removed the peril, and, as Spain declined from the first place in Europe, France stepped into it.

Meantime the Thirty Years' War (1618-48) was desolating Central Europe. The princes of North Germany proved timid and incapable; and the cause of Protestantism was saved only by foreign intervention, by Denmark, by Sweden, and finally by Catholic France. At the close of the struggle, the first European Congress reorganized Europe. By the Peace of Westphalia, France received most of Alsace and some other Rhine districts. The independence of Switzerland and of the United Provinces was formally recognized. Sweden, already reaching down both west and east shores of the Baltic, secured much of the south shore also, with command of the mouths of the German Oder, Elbe, and Weser. On the other hand, the Empire lost more than territory. The political rearrangements within that state reduced the imperial Diet to the level of a useless debating society and put an end to whatever had persisted of national unity. From this time until it vanished, a century and a half later, the Holy Roman Empire was a meaningless survival, cumbering the earth, and the Hapsburg "Emperors" derived their only real importance from their position as hereditary archdukes of Austria. To most of Germany the war had brought blasting ruin. Half the population and two thirds the movable property were swept away. Land tilled for centuries became waste, and men became savages. Not till the middle of the nineteenth century did large districts again contain as many homesteads and cattle as in 1618; while the low position of the German peasantry, until 1850, was due in great measure to this war.

American Colonization.—Before the religious wars closed, the continent of Europe had ceased to be the sole scene of important historical development. American colonization was well advanced, and political liberty had received a remarkable development both in England and in English colonies. These topics demand attention before the student enters upon the consideration of the next period of European wars.

Spain made her first settlement upon the American continent at the Pearl Coast in 1513. Then sweeping to north and south, she took swift possession of all South America except Brazil, all Central America, and of the Floridas and Californias, far up both coasts of North America, while plans were afoot to plant her flag over the rest of that continent. But the ruin of the Armada, together with Spain's decay at home, came in time to leave room for other colonization. France seized upon the mouths of the Mississippi and the St. Lawrence, the apparent gateways to the continent; and English colonies stretched themselves in patches along the fringe of the North Atlantic coast. The Dutch spent their colonizing energies main-

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ly in the Orient; and, despite some ambitious beginnings, Sweden soon grew too weak to be a serious factor in North America. Thus that continent was left in dispute between Spain, France, and England. The contest was to be interwoven with the European wars of the last half of the seventeenth century and of the eighteenth century, and the outcome was big with consequence to the world. All European countries except England governed their colonies on despotic plans. The English colonists took to the New World institutions and principles of freedom, and soon gave them a wider development there than had been possible even in the old home. Besides the rights of free speech and jury trial and *habeas corpus*, each English colony had from the first, or very quickly inaugurated, a representative legislature with full parliamentary privileges and with control over taxation. In several colonies, local government also was conducted on extreme democratic principles. Not until two hundred years later did any of these free principles appear in the colonies of any other people,—and then only because of the success of the English colonies.

England in the Seventeenth Century.—In England itself the seventeenth century saw an important development in free government. Through the Stuart period, from 1603 to 1688, England was engaged in a critical struggle between the royal claims of "Divine Right" government and the rising spirit of popular government. Except for brief intervals the conflict was parliamentary, not military, but it was constant and stubborn. Much of the time it was confused with ecclesiastical questions, which, to the men of the time, often seemed the chief issue; and it was fortunate, indeed, that the stern heroism of Puritanism became engaged on the side of political liberty. During this century, too, England was the last remaining battle ground in Europe for free government. In the other large states,—in Spain, France, Austria, in the Scandinavian lands, even in the petty principalities of Italy and Germany,—despotism was triumphant. In England, popular principles not merely maintained themselves against the Stuart attack; they came out of the conflict with increased vitality. The great experiment of a Puritan Commonwealth failed; but after the Stuart Restoration it became apparent that the body of the monarchists themselves were now thoroughly devoted to parliamentary government, and the attempt of the later Stuarts to set up a personal absolutism called forth the "Glorious Revolution" of 1688, which established the supremacy of Parliament over the king.

Dynastic and Commercial Struggles, 1648-1783.—We now return to the general development of Europe after 1648. On the continent the period from the Peace of Westphalia to the French Revolution (1648-1789) is marked (1) by absolutism within the several states and (2) by dynastic interests in their foreign relations,—with incessant selfish war, as the result. The famous phrase ascribed to Louis XIV. of France,—"I am the State,"—might have been used appropriately by any monarch of the time outside of England. A few great rulers dominate the period. Indeed the stage is largely filled by three monarchs,—Louis XIV. (1643-1715), Peter

the Great (1689-1725), and Frederick the Great (1740-86). The influence of Peter was restricted for the most part to Russia; but the other two belong to all Europe, and the period divides itself naturally into the Age of Louis XIV. and the Age of Frederick II. The chief aim of statesmen was to prevent any one country from becoming too strong for the safety of its neighbors. The Peace of Westphalia had transferred political predominance from the Hapsburgs to the Bourbons. Thus, during the first half of the period France threatened the "balance of power," and league after league of other powers was organized against her. International morality, however, was low; and commonly rulers were willing to let a strong power rob a weaker one if they could find "compensation" by robbing some other state themselves. In the last wars of Louis XIV., just before and after 1700 (known in American history as King William's War and Queen Anne's War), the dynastic interests of European ruling families became merged in a titanic, century-long struggle between France and England for world dominion,—though neither country was yet fully conscious of the import of the strife.

In Europe, France was no longer in peril, as she had been in the period preceding Richelieu; and Louis the Fourteenth's half-century of war was merely a struggle to enlarge his dominions. For a generation the victories of Turenne dazzled Europe; and France annexed some important strips of territory on the east, at the expense of Spain and of the decaying Empire. But in the closing period, when the Allies also had found great generals, in the English Marlborough and the Austrian Prince Eugene, even success in the field deserted Louis; and to a comprehensive view his failure was profound. Exhausted France was crushed by taxation to pay the interest of the war debt; while, in attacks upon petty provinces in Europe, she had wasted energies and opportunities that might have made her supreme in Asia and America. Within, the economic reforms of the great Colbert were abandoned; and the revocation of the Edict of Nantes (1685) drove into exile more than two hundred thousand of the best citizens of France. The effect corresponded in a measure to the effect upon Spain of the expulsion of the Moriscos somewhat earlier. The Huguenots had comprised the skilled artisans and the enterprising merchant classes; and their flight added to the terrible economic demoralization and deprived France of all chance at industrial leadership.

To men of the time, however, the failure was partially disguised by the glamor that surrounded the court of the *Grand Monarque*. French literature, brilliant and sparkling, was in its first splendid period; and French intellectual leadership survived for more than a century. Until after 1800, the court of Louis XIV. remained the model for every court in Europe; and French thought, French fashions, and the French language were the common property of all polite society.

The Treaty of Utrecht (1713), while it left France still one of the three greatest powers, marks her recession from predominance. Spain resigned her territories and claims in Italy and on the Rhine, and, except for her decaying

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colonies, withdrew finally within her own peninsula. England gained Newfoundland and Nova Scotia from France, and in Europe she secured command of the Mediterranean by the conquest of Gibraltar and Minorca. By the same treaty and by the rearrangements that immediately followed, the old Spanish Netherlands, the Duchy of Milan, and the Kingdom of Naples and Sicily fell to Austria. The Duke of Savoy (one of the faithful allies against France) acquired Sardinia, with the title of a kingdom for his enlarged state. A little before, in 1701, the Elector of Brandenburg had secured the title of King of Prussia. Thus, out of the wars of Louis, at the beginning of the eighteenth century, arose the two kingdoms, Prussia and Sardinia, which in the latter part of the nineteenth century were to make modern Germany and modern Italy against the will of modern France.

About 1700, other important changes took place in the map of Europe. For three centuries, Austria had been one of the chief bulwarks of Christendom against Mohammedanism. In 1683 Vienna had been besieged by the Turks, and had been saved only by the arrival of the gallant Sobieski with his Polish chivalry. But thereafter Austria took the offensive. She won back Hungary, and then, step by step, extended her dominions down the Danube valley and the Illyrian coast. In the latter part of the reign of Louis XIV., the Austrian Hapsburgs, turning away from the Rhine, definitely adopted a Danubian policy and sought to aggrandize themselves by seizing Slav territory from Turkey.

This new policy of Austria gave Louis XIV. a freer hand on the Rhine than he otherwise would have had, and so helped on the decline of Holland. In 1640, Dutch vessels carried the commerce of the world,—even the greater part of that between England and her colonies. Soon after that date, however, England attacked the Dutch commercial supremacy by navigation laws, and at last by war. Fearful of French conquest, and deserted or timidly defended by Austria, Holland had no choice but to ally herself to her commercial rival. After 1689 in particular (when William of Orange became King of England), Holland followed the lead of England in politics, while that country drew to herself the Dutch carrying trade.

In the north of Europe the former great powers, Sweden and Poland, were declining before the rise of Russia and Prussia. Peter the Great (1689-1725) consolidated the government in Russia, introduced a veneer of Western civilization, and started his country on its deliberate march toward distant seas, west, south, and east. Peter himself secured the western "window" by seizing from Sweden the south-eastern Baltic provinces. In the middle of the century, the Empress Elizabeth (1741-62) robbed Sweden of the rest of the Baltic coast up through southern Finland. The northern half of Finland remained Sweden's until Alexander I. seized it in the Napoleonic wars; but toward the close of the eighteenth century, under Catherine II., Russia began her advance along the Black Sea at the expense of Turkey. Under the same ruler occurred the Russian gains in the partitions of Poland,—a story which can be understood only in connection with the rise of Prussia.

For three centuries the Hohenzollern Margraves of Brandenburg had been patiently adding scrap by scrap to their realms. Soon after 1600 these dominions lay mainly in three widely separated groups,—Cleves on the Rhine, Brandenburg on the Elbe, and East Prussia beyond the Vistula. The object of Hohenzollern politics was to consolidate these provinces by acquiring intermediate territory. Toward the close of the Thirty Years' War, Frederick William, the Great Elector, made important headway in this respect and accomplished still more for his country after the close of that struggle by persistently maintaining peace and fostering industry. It was his son who in 1701 secured the title of King. The second king of Prussia built up a magnificent army and reared a son who was to use it magnificently. Frederick II. ascended the throne in 1740 and began his long reign by an unjust but profitable war. The Hapsburg realms had just fallen to a woman, and, disregarding solemn treaties, Frederick took unscrupulous advantage of the supposed weakness of the Archduchess, Maria Theresa, to seize from Austria the rich province of Silesia. The heterogeneous Hapsburg realms seemed about to fall to pieces; and Spain, France, Savoy, and Bavaria hurried to join Prussia in dismembering the carcass. But England and Holland threw themselves into the struggle on the Austrian side, and the Treaty of Aix la Chapelle (1748) closed the War of the Austrian Succession without further territorial changes. Frederick kept Silesia, reaching far down into the heart of Germany, and Prussia stood forth as one of the great powers.

The significance of the contest, however, lay in its wide extension into India and America. Indeed, colonial war between England and Spain had already begun before Frederick appeared on the stage, and France must soon have joined Spain in any event. In the New Worlds, too, the Peace restored the former boundaries; but the war marks a clear consciousness in England and France that the two were rivals for vast realms outside Europe. The family interests of monarchs as a cause for war were giving place to the commercial interests of English and Dutch merchants as opposed to those of French and Spanish merchants, while back of these selfish motives lay the mighty question, big with consequence to the world, whether French or English political ideas should hold the New World.

In 1756, Austria fortified herself by alliance with Russia, Sweden, and even her old enemy France, and prepared to destroy Prussia. Frederick's supreme military genius saved his country for the moment, and the next year England came to his aid. During the brief interval between the European wars, England and France had practically remained at war in America; and now that France had joined Austria, England was constrained to support Prussia. In all the period from 1680 to 1815, no matter what the origin of the wars, England and France soon became the chief factors; and though they were at one time or another on every side of every question, they were never on the same side at the same time.

This Seven Years' War (1756-1763), or Great French War, as it is commonly known in

America, was literally a world-wide struggle. Red men fought by the Great Lakes of North America, and black men fought in Senegal, while Englishmen and Frenchmen grappled in India as well as in Germany, and their fleets engaged on every sea. The showy battles took place in Germany, and on the whole the European conflict determined the wider results. Pitt, with vision fixed upon a coming British empire, declared that in Germany he would conquer America from France. This he did. England furnished the funds, and her navy swept the seas. Frederick, supported by British subsidies, furnished the generalship and most of the troops for the German battlefields. The striking figures in the struggle are (1) Pitt, the English imperialist and the directing genius of the war; (2) Frederick, the military genius, who won Pitt's victories in Europe; (3) Wolfe, who won French America from the great Montcalm; and (4) Clive, the East India Company's clerk, who laid the basis for England's supremacy in India.

Changes in the World-Map; the American Revolution.—The Treaty of Paris (1763) left Europe without change; but in India France lost all except a few unfortified trading posts, while in America England received Florida from Spain, and Canada and the eastern half of the Mississippi valley from France. France ceded to Spain the western half of the Mississippi valley, in compensation for the losses Spain had incurred as her ally; and, except for her West India islands, she ceased to be an American power. Spain still held South America and half North America; but her huge bulk was decaying day by day. Holland, too, with widespread empire, was plainly in decline. England, having dispossessed France in both Asia and America, stood forth as the leading world-power.

The American Revolution, a few years later, did not lessen this pre-eminence; but it had other results of supreme significance. The war came because the American colonies had really become a nation, and because the English government unwisely insisted upon managing American affairs after the Americans were quite able to take care of themselves. English interference in economic matters had long been irksome, and the danger of interference in ecclesiastical matters was feared. England had just relieved the colonies from fear of French conquest. External bonds were gone, and internal ties were dissolving. Then George III. and his ministers supplied the necessary jar to effect separation by trying to raise revenue in America by Acts of Parliament. Astute patriots rallied the majority of the Americans by an old English shibboleth; and after a bitter eight-years conflict (1775-83), the thirteen English colonies became the first free American nation.

The Revolution "split the English race and doubled its influence." It paved the way for a more enlightened economic science, since, contrary to all expectations, the trade of free America from the first proved more valuable to England than that of colonial America had been. It reacted upon England, so that, when the great wars were over, both that country and its remaining colonies made new advances in political liberty. It set up the standard of

independence for the states of Spanish America in both continents. But its supreme importance lay in the birth into the family of nations of the United States itself, though the full significance of the new nation hardly began to impress Europe for more than two generations.

England's European enemies had seized the opportunity to attack her in a war of revenge. England came out of the contest with glory little tarnished. She had been fighting, not America alone, but France, Spain, and Holland, as well; and though she had lost the best part of her old American empire she was not without compensating gains. She seized Dutch colonies at will; she strengthened her grasp upon India; she won back the undisputed sovereignty of the ocean by shattering the navy of France; she rebuffed all assailants from the rock of Gibraltar, the key to the Mediterranean; and in some measure she made good even her American loss by the acquisition of Australia just afterward.

The Partitions of Poland.—To return to continental Europe in the closing half of the Age of Frederick the Great:—one more territorial change calls for attention. Poland had fallen into anarchy under its elective, figure-head king and its oligarchic nobles. This anarchy gave the neighboring powers excuse for plunder. Catherine II. determined to seize a large part of the country. Frederick II. persuaded his old enemy, Austria, to join him in compelling Russia to share her booty. The First Partition of Poland (1772) pared off a deep rind. The Second and Third Partitions, which "assassinated the kingdom," had not even the pretext of misgovernment in Poland, for the Poles had earnestly taken up the work of reform. These final divisions took place in 1793 and 1795, after the death of Frederick, amid the wars of the French Revolution. Prussia gained large extent of territory, with valuable sea coast; and, most important of all, the additions brought the principal Prussian provinces,—formerly scattered,—into a compact body. But Russia gained far the greatest part of the territory, and she now bordered Germany on the east, as France had come to do earlier on the west, after the destruction of the Burgundy of Charles the Bold. The wise policy of the Germans, early and late, would have been to support the buffer states against the greed of Russia and France. Failure to do so has left Germany exposed ever since to direct attack by powerful enemies, and has compelled her to build up artificial frontiers of fortresses and bayonets, and to accept an undue militant character for all her civilization.

The Beneficent Despots of the Eighteenth Century.—In foreign relations, the Age of Frederick the Great saw little improvement over that of Louis. In the government within the several states, however, there was a beneficent and significant change. Frederick of Prussia, Catherine of Russia, Charles III. of Spain, Leopold of Tuscany, Ferdinand of Naples, Joseph II. of Austria, all belonged to a new class of "crowned philosophers" and "benevolent despots" who sat upon the thrones of Europe in the latter half of the eighteenth century. In Sweden and Portugal, also, great ministers sought to impose a liberal policy upon the monarchs, as

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Turgot succeeded in doing for a while, even in France. A remarkable school of French writers,—Diderot, Voltaire, Rousseau,—had created a new, enlightened sentiment in the ruling classes, and a new sense of responsibility. Government was no more by the people than before, but despots did try to govern for the people, not for themselves. Sovereigns spoke of themselves no longer as privileged proprietors, but, in Frederick's phrase, as "the first servants of their states." All these rulers planned far reaching reforms,—the amelioration or abolition of serfdom, the correction of abuses in the church, the building up of popular education. In Prussia, for a time, much was accomplished. The condition of the peasantry was improved; the administration was rendered economical and efficient; and wealth and comfort began to increase by bounds. But these happy results were secured only by the tireless energy of one of the world's greatest geniuses. On the whole the liberal monarchs made lamentable failures. One man could not lift the weight of a nation. It remained to see what the people could do for themselves. The age of enlightened despots was the prelude to the French Revolution.

THE AGE OF NATION STATES.—*The French Revolution, 1789-99.*—In the latter part of the Middle Ages, Italy had given the world an intellectual revolution; Germany began Modern History with a religious revolution; and France now introduced the last great division of the Modern period by a political and social revolution. Pre-eminently among political revolutions, the French Revolution deserves the name. The English Revolution of 1688 swept away temporary interference with ancient principles of English politics; the American Revolution made the Americans politically independent, but did not directly change the character of their society; the French Revolution cut loose from the past, and started France, with all the world, upon new lines of growth.

But if it destroyed the old, it also built the new. The work of destruction was needlessly horrible and bloody; but as a whole the Revolution was a vast and fruitful reform. The really significant thing is not the temporary mob-rule and bloodshed; the significant thing is the great national awakening which swept away an absurd society, founded on ancient violence and warped by time, to replace it with a simpler social system, based more nearly on equal rights.

The chief institutions of France were: (1) a monarchy, centralized, despotic, and irresponsible; but in weak hands, incumbered by complex survivals of ancient local institutions, and hampered by its respect for the good opinion of the privileged classes; (2) an aristocracy, wealthy, privileged, corrupt, skeptical; and (3) an established church, wealthy and often corrupt. Below these spread the masses, a necessary but ugly substructure. Over the continent, similar conditions held sway. In France the nobles had fewer duties, the peasantry had more completely risen out of serfdom, and more of a middle class had grown up, than in the other large countries of the continent. Feudal society was more decayed, and industrial society more advanced. The great European revolution broke through at the weakest spot.

The fundamental cause of the Revolution was the unjust privileges of the favored classes and the crushing burdens of the masses. The evil was no greater than for centuries, but the consciousness of it was greater. The masses began to demand reform; and the privileged classes had begun to distrust their rights.

The Revolution is usually dated from the meeting of the States-General in 1789. The king had summoned that body, hoping to induce the privileged orders to give up their exemptions from taxation, and so relieve the bankrupt treasury. The Third Estate, representing the middle class, and the liberal nobles and clergy had assembled with the determination to secure far-reaching reforms and to establish a "constitution." A sharp contest, with a brief period of anarchy, left power in the hands of these liberal elements, where, despite some attempts at counter-revolution and some danger of mob predominance, it remained for two years. The Constitution fashioned during this period provided for a weak kingship and abolished nobility and all special privileges before the law; but it carefully entrenched middle-class supremacy against democracy by graded property qualifications and a complex system of indirect elections.

Further changes were inevitable; but, if France had been left to herself, they might have come about as quietly as these first ones. Instead, foreign war gave the movement a new character. War was inevitable. Emigrant nobles gathered their forces on the Rhine under the protection of German princes. The Emperor, Leopold, brother-in-law of Louis of France, called upon the sovereigns of Europe to recognize the cause of Louis as "the cause of kings," and demanded from France such changes in her government as should protect Europe against the spread of revolution. This presumptuous dictation in their internal affairs roused a tempest of righteous wrath in the French nation; and in 1792 war began between "the cause of kings" and "the cause of peoples." For twenty-three years Europe was engaged in strife, upon a greater scale than ever before in history.

France was girdled with foes. The Empire, Prussia, and Sardinia, were at once in arms. Naples and Spain joined the coalition. Sweden and Russia both offered to do so, if needed. Ere long England and Holland were added to the enemies who expected to partition France. Vast armies invaded France; and the French forces were demoralized by treachery of officers and by fear of royalist plots. If France was to be saved, it could not be done by half-measures, nor with a king in secret alliance with the enemy. Control fell to extremists; and, while the mighty Danton roused and organized the national energies, the frenzied mob, unhindered, answered the victories and boastings of the invaders by the attack on the Tuileries and the Massacres. In September, the Convention established the French Republic with extreme democratic features and with manhood suffrage. Then revolution within revolution transferred power to more and more radical factions. The defeated Girondists raised the provinces against the capital; and for a time Paris and a score of central departments faced the remaining three fourths of France and

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united Europe. Out of this crisis, in 1793, grew the great Committee of Public Safety, which ruled France for a year with despotic power. The Revolution now became constructive, and never has the French genius for organization shown itself more triumphantly. The Committee deliberately adopted a policy of "Terror" to crush plots and dissension and to secure united action. Revolt was stamped out. A million soldiers were sent to the front. The invaders were rolled back in rout, and the ragged but devoted French armies swarmed victoriously across all the frontiers, to sow civil liberty over Europe with fire and sword. France was not again in serious danger from foreign foes until the fall of Napoleon, twenty years later.

Meantime, while the grim, crime-stained men of the Committee in war and tumult were organizing order within and victory abroad, the Convention was laying anew the foundations of French society and advancing the progress of the human race. It adopted the projects of Cambracérès for the codification of French law, and the plans of Condorcet for a system of national education; it accepted Argobast's metric system of weights and measures; it abolished slavery in the French colonies, created provision for the public debt, instituted the first Normal School, the Polytechnic School, the Conservatory, the Institute of France, the National Library, and began the improvement of prisons and hospitals, and the reform of youthful criminals. Meantime the peasants had become free landholders, and the whole laboring class was rising rapidly in standard of living.

In 1794 the Jacobins split into factions, and these turned the "Terror" upon one another. The following year a conservative reaction gave the Republic a new constitution, which restored property qualifications and indirect voting. But the new plural executive (the Directory) proved incompetent and corrupt, and kept itself in power only by a series of *coups d'état*. It was assailed by conspiracy, radical and royalist; and France breathed more easily, when, in 1799, Bonaparte overthrew it with his troops and set up a firm military despotism, veiled by plebiscites.

Napoleonic Period, 1800-15.—For fifteen years, as First Consul (1800), Consul for Life (1802), and Emperor of the French (1804-14), Napoleon was sole master of France. He preserved the principle of civil equality and all the economic gains of the Revolution, but political liberty for a time was lost. True, his rule was a denial of the old doctrine of Divine Right: each new usurpation received the sanction of a popular vote, and he boasted that he was chief by will of the people. But every form of constitutional opposition was crushed or muzzled. The legislative chambers existed only to speak when and as he chose; free speech, free press, and all security for personal liberty were suppressed by a system of spies and secret police and by arbitrary imprisonment of suspects; local administration was centralized more highly than even under the old monarchy, "nor did there exist anywhere independent of him authority to light or repair the streets of the meanest village in France."

This all-pervading absolutism was directed by the penetrating intelligence and indomitable

energy of the world's most "terrible worker"; and it conferred upon France great and rapid benefits. Order, precision, symmetry were introduced into every branch of the administration. The interrupted work of the Convention was resumed. Education was organized; law was simplified and codified; the church was again brought into alliance with the state; industry was fostered, and magnificent public works were carried out. But in all this, Napoleon was merely the last and greatest of the beneficent despots. And in the outcome, his rule fixed more firmly than before in the mind of the nation the dangerous willingness to depend upon an all-directing central power; so that in our own day, after many revolutions, the supremely difficult task of the Third Republic has been to create the spirit of local self-government.

No doubt, in 1800, when Napoleon came into power, he sincerely desired peace, in order to reconstruct France. By the brilliant victories of Marengo and Hohenlinden he dissolved the hostile coalition, and a series of treaties, closing with the Treaty of Amiens (1802), gave Europe a breathing spell. But soon Napoleon again desired war. His victories in Italy, as a general of the Directory, had first brought him to the world's notice, and only military glory could keep France from murmuring at his rule. Moreover, he aspired frankly to European empire. On the other hand, the nations felt that there could be no lasting peace with him except by complete submission to his will. In 1803, England and France renewed their strife, and between these powers there was to be no more truce until Napoleon's fall, eleven years later. In that time Napoleon fought also three wars with Austria, two with Prussia, two with Russia, a long war with Spain, and various minor conflicts. From 1792 to 1802, the unceasing European wars belong to the Revolutionary movement. From 1803 to 1815, they are properly Napoleonic wars, due primarily to the ambition of a great military genius. In the first series, Austria was the chief opponent of the Revolution; in the second series, England was the relentless foe of Napoleon.

Napoleon's insight readily divined his true enemy; but Nelson's great sea fight put an end to all possibility of directly invading England. On the continent, however, victory followed victory. After Austerlitz (1805), Austria gave up her remaining Italian and Illyrian territory, and many of her possessions in Germany. After Jena (1807), humiliated Prussia was reduced half in size, thrust beyond the Elbe, and bound to France by a shameful treaty. Less decisive conflict with Russia was followed by the diplomatic victory of Tilsit (1807). Emperor and Tsar entered into friendly alliance. France was to have a free hand in Western Europe; Russia was to be permitted to aggrandize herself at the expense of Sweden, Turkey, and Asia; and the two were to join in ruining England by enforcing Napoleon's "continental system."

The refusal of Portugal to obey Napoleon's command for the confiscation of English commerce led to the seizure of that state. Then followed a like seizure of Spain, out of which grew the long Peninsular War, which, as Napoleon confessed afterward at St. Helena, was

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really the canker that destroyed him. At the time, however, it seemed trivial, and for five years after Tilsit Napoleon was master of the continent. At its greatest extent the huge bulk of France filled the space from the ocean to the Rhine, including not only France as we know it, but also Belgium, half of Switzerland, and large strips of Germany, while from this central body two outward-curving arms reached toward the east, one along the North Sea to the Danish peninsula, and the other down the coast of Italy past Rome. The rest of Italy and half the rest of Germany were under Napoleon's protection, ruled as vassal states by his brothers and generals. Denmark and Switzerland were his willing allies, and Prussia and Austria were unwilling ones. Sweden and Russia, though nominally his equals, were allowed that dignity only because they upheld his policy. Only the extremities of the continent,—the islands of Sicily, Sardinia, and England, and the mountainous Spanish peninsula,—kept their independence, at the cost of wasting war.

The period was filled with important rearrangements for Europe, territorial, political, and social. Many of these were designed in selfishness; but nearly all were to bear good fruit. In particular, the Germany and Italy of to-day were made possible by Napoleon's fearless clearing away of old institutions, and by the vigorous impulse he gave to the new forces of political unity and social reform.

In Germany, even the territorial rearrangements paved the way for later national unity. Not only the twelve hundred anarchic territories of the "knights," but also the three hundred petty, scattered, despotic principalities, ecclesiastical states, and oligarchic city-republics (with a few exceptions) were absorbed in larger neighbors; so that the multitudinous, ill-governed states of the vanished "Empire" were consolidated into less than forty. Most of these reorganized states, outside Austria and Prussia, were further combined in the Confederation of the Rhine; and in this Confederation, as well as in the German and Italian territory annexed to France, and in the various vassal states over Europe, serfdom and feudalism were abolished and civil equality and the Code Napoleon were introduced. The administration of justice was made cheap and simple, and the old clumsy and corrupt methods of government gave way to order and efficiency.

Most important of all, similar reforms were adopted in Prussia, not from French pressure, but by the influence of the Prussian minister, Stein, who sought to make his country strong enough to throw off the French yoke and to regenerate Germany. Napoleon's insolence had at last forced part of Germany into a new national patriotism; and that patriotism began to arm itself by borrowing weapons from the arsenal of the Revolution.

Napoleon's "continental system," if embarrassing to England, was ruinous to Europe. Moreover, Tsar Alexander began to suspect Napoleon of intriguing against him in Finland and Turkey; and in 1811 he refused longer to follow Napoleon's commercial policy. Napoleon declared war. The destruction of his Grand Army amid Russian snows was the signal for the rising of the peoples of Central Europe in the Wars of Liberation. Napoleon, like a

desperate gamester, refused all terms, and finally was crushed and deposed. The Bourbon dynasty was restored to the throne of France, and the powers met in the Congress of Vienna (1814-15) to reconstruct the map of Europe.

The Congress of Vienna.—In its desires, that Congress stood for reaction. Says Fyffe, "It complacently set to work to turn back the hands of time to the historic hour at which they stood when the Bastille fell." It ignored peoples, and considered only princes. Its work, therefore, had to be slowly undone through the next half-century.

Still, its power for restoration was less than its wish; and even its most selfish work contained seeds of progress. Nobody thought of restoring the old ecclesiastical princes, nor of undoing the consolidation of Germany. That country was left in thirty-eight states, and Italy in twelve. Austria, which had lost territory in Central Europe, received its compensation in Italy, so that its despotic energies were more than ever drawn away into Italian and Danubian questions. Renovated Prussia, in return for Slav lands, which it ceded for the Tsar's new Kingdom of Poland, received German territory,—half of Saxony, the Pomeranian sea coast, and German provinces on the Rhine taken from France. Thus, reaching down into the heart of Germany, and with distant isolated districts to defend on the Rhine and on the Niemen, Prussia stood forth the natural champion of Germany against Slav and Gaul. In like manner, Sardinia's gain of Genoa was one more step in the consolidation of Italy. In return for the vast national debt incurred in supporting coalitions against Napoleon, England added still further to her colonial supremacy by holding South Africa, Cyprus, Malta, and other important stations. Despite its brief welcome to Napoleon at his return from Elba, France was wisely left with the boundaries she had when the Revolutionary wars began. The most serious disappointment to the liberals was the failure to secure a national union in Germany. Reactionary Austria secured instead the Germanic Confederacy—a loose league under Austrian presidency, with a Diet which was merely a meeting of ambassadors,—"a polite and ceremonious means of doing nothing."

It was worth much to Europe merely to recognize that it had common interests which could be arranged by a peaceful congress. Even this gathering of despots was an advance from eighteenth century politics toward a better international organization. Some of its work, moreover, was distinctly progressive, such as the declaration against the African Slave Trade, the opening to commerce of the rivers flowing between or through different countries, and especially the neutralization of Switzerland under the protection of the powers.

From 1815 to the Revolutions of 1820.—For more than thirty years after the Congress of Vienna, reaction held sway. The restored princes, who "had learned nothing and forgotten nothing," strove to ignore the progress from 1789 to 1815. In Sardinia, serfdom was restored; in Spain and the Papal States, the Inquisition and other mediæval institutions; in some places, even street lamps were abolished along with other hateful French reforms. Five states,—Russia, Austria, Prussia, England, and

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France.—determined the policy of Europe. The first three were divine-right despotisms; and though the Tsar and the King of Prussia played for a time at liberalism, the first disorders enabled Austria to draw them over to her own frankly reactionary program. At first, France and England were not much better than these Eastern powers. Louis XVIII. had found it necessary to give France a charter; but in that document itself the theory of divine right was preserved, until the revolutionary changes of 1830. That theory could have no place in England; but even there the government was for many years in the hands of an extreme Tory party. The evil genius of the whole period was the subtle Austrian statesman, Metternich, with his motto, "Government is no more a matter for debate than religion is." The one good thing to be said for Metternich's long supremacy is that he permitted no great war; and this was because he felt it necessary to hold the powers in friendly alliance, so as better to arrest progress within the lines drawn at the Congress of Vienna.

However, beneath the tide of reaction, the principles of the Revolution survived. The two positive forces in politics for the 19th century were to be democracy and nationality. The league of princes compelled them to work underground; but before the middle of the century they emerged in three series of revolutions—in 1820, 1830, and 1848.

The revolutions of 1820 started in Spain, to re-establish the Constitution of 1812, which had been adopted first during the war for Independence. Completely successful there for the time, the movement spread swiftly over the southern peninsulas—to Portugal and to the states of North and South Italy, while it stimulated the Greek rising against the Turks. Metternich found a weapon of repression ready. After Waterloo the four great allies, Russia, Prussia, Austria, and England, had agreed to preserve their union against revolutionary France by holding occasional congresses. Metternich now summoned these powers to the Congress of Troppau. Here the despotic masters of Russia, Austria, and Prussia signed an agreement to unite in putting down revolution against any established government. England protested and withdrew from the alliance; but her place was taken by France, and the united despots, popularly known as the "Holy Alliance," proceeded to carry out the Troppau programme. With overwhelming armies they crushed constitutionalism in Naples and Piedmont, and a little later, in Spain. England's fleet preserved the little sea-coast country of Portugal from attack; and the Tsar's sympathy for his Greek coreligionists held Metternich from aiding Turkey. Portugal and Greece were the only European lands to reap good from the widespread risings of this period.

American Progress.—Greater gain there was, however, outside Europe. The "Holy Alliance," successful in Spain, wished to restore monarchic control over revolted Spanish America. Here they failed. When Napoleon seized Spain (1808), the Spanish colonies, nominally loyal to the old Spanish dynasty, began to taste the sweets of economic and political freedom. They were powerfully influenced, too, by the

success of the United States; and soon they began, one after another, to avow independence not only of Napoleon, but also of the mother country. The United States had recognized their independence. England had not done this; but now she interposed her sea-power to shield them against the proposed attack by the "Holy Alliance." England, indeed, urged the United States to join in a formal alliance to protect Spanish America. The United States chose to act separately, but it did act along the same line: in 1823 President Monroe's message announced that this country would oppose any attempt of the despotic powers to extend their political system to America. Thus was born a group of new nations. For more than fifty years, it is true, the best of the new states manifested anarchic tendencies; but before the close of the nineteenth century some of them began to make steady and promising progress in government and society. Their constitutions have been modeled generally upon that of the United States.

Before returning to Europe, brief attention should be given to the progress of the United States itself in the generation following the French Revolution. The Constitution of 1787 saved the thirteen States of that time from falling apart into jangling, insignificant units, and gave the world an advanced type of federal government. The Louisiana Purchase (1803) doubled the territory of the country and confirmed its destiny as the home of a mighty continental nation. During the closing Napoleonic struggles, the contemptuous disregard of England for the rights of neutrals, together with the treacheries of Napoleon, involved America in war with England; but, beyond this, except for the enunciation of the Monroe Doctrine, the United States, busied with its marvelous growth at home, had kept free from foreign complications. At the moment of the European revolutions of 1820, the great American Republic was entering on the forty years of anti-slavery debate which preceded the Civil War.

Revolutions of 1830.—The year 1830 is one of the notable dates in the 19th century. In America the victory of Jackson had just marked a fresh advance in popular government. In England the First Reform Bill began its two-year struggle in Parliament. On the continent of Europe, revolution struck a new blow at the system of Metternich. This time the movement started in France, where the July Revolution replaced the divine-right Bourbon monarchy with the constitutional, bourgeois monarchy of the Orleanists. Explosions followed over Europe. The Belgians rose against their Dutch masters; the Poles against Russia; Italian risings seemed for a moment to have some chance in the papal states and the duchies; and, while Russia and Austria were busied in Poland and Italy, liberal gains were secured in several German states. But soon Metternich, his hands free once more, set himself patiently to restore the old order in Germany. France, it is true, was lost to the "Holy Alliance," and joined England in defending liberal Belgium against despotic intervention. But in the final result, France and Belgium were the only gainers from this period. It was to take the third great "year of revolutions," to sweep away Metternich's shattered system.

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To appreciate in any measure the wonderful progress of the remaining two thirds of the 19th century, it is needful to grasp the conditions of the world of 1830, or, we may say, of 1837, when the Victorian era began. It was still a small, despotic world, far more remote from the great, progressive world of 1900 than from the world of 1600. Civilization held only two patches on the globe,—western Europe and eastern North America. In the latter, the real frontier of the United States reached less than one third the way across the continent, and politics and society were dominated by the slave power. Europe knew "Germany" only as a pious aspiration of revolutionaries, and "Italy" as a "geographical expression." Metternich stood guard over central Europe. On the east hung Russia, an inert mass, in the chains of her millions of serfs. Under the contemptible Orleans monarchy, France was taking breath between spasmodic revolutions. England herself had only begun to stir under the long oligarchic rule of her landlord class. The rest of the globe hardly counted; a fringe of Australia held a convict camp; eastern Canada was a group of jealous, petty provinces, learning to agitate in disorderly fashion for self-government; Spanish America, prostrate in anarchy, gave as yet little hope of the coming renaissance; Japan was to sleep a generation longer; while the two largest continents were undisturbed in their native barbarism, except for England's grasp upon the hem of India and South Africa.

England in the 19th Century.—In Europe, England was to lead the van of progress; and in England, almost alone in Europe, reform was to come without revolution. But the England of 1830 was still mediæval. During the great French wars from 1690 to 1815, except for the one development of ministerial government, England had retrograded politically and socially. Her society was marked by extreme inequalities between rich and poor, intensified by cruel class legislation; her government, superficially representative, had really fallen into the hands of a selfish landlord class; her boasted local self-government was intensely aristocratic; her established church was aristocratic and unspiritual. In the last half-century had come an industrial revolution—the growth of the factory system—with marvelous increase of population and growth of city life, calling imperatively for new adjustments; but the great Tory party met all calls for reform with sullen denunciation and repressive legislation which made free speech a crime.

Under the system of rotten and pocket boroughs, more than half the House of Commons were the appointees of less than 200 landlords, while most of the rest represented small fantastic constituencies. Thus, reform necessarily began with Parliament itself. This parliamentary reform was accomplished by three great measures: that of 1832 placed power in the hands of an intelligent middle class, the landed and mercantile interests; 35 years later, the Second Reform Bill (1867) gave power to the artisan class of the towns; and the bill of 1884 once more doubled the electorate and left England a democracy.

The Reform Bill of 1832 was followed at once by social reform, in response to the swelling tide of humanitarianism in literature and

society. Legislation swept away negro slavery in the colonies, and the hideous white slavery of women and children in English factories and mines; reformed the barbarous and fantastic criminal code; abolished the worst abuses of the pauperizing poor-law; began the protection of workmen in factories against carelessness or wilful neglect of capitalists; gave women legal rights; adjusted taxation more equitably; swept away the corn laws and introduced the free-trade era; removed the press gang, and brought in the penny post; enlarged the self-government of the colonies; and established a wonderfully efficient system of democratic self-government in cities at home. Subsequent political reform, despite the Irish difficulties after 1870, added to the rate of social reform. In particular should be noticed the complex industrial legislation, and, for dependencies where the nature of the population forbids self-government, the adoption of efficient, unselfish colonial administration, in which England has set an example for all world powers. Even India and Egypt, with their tremendous difficulties, have been touched with new life; while the great provinces of the English-speaking colonies, Canada and Australia, have organized themselves into two mighty federal states (1867 and 1901). In the rural units of England, too, the local government bills of 1888 and 1894 established true democracy.

Revolutions of '48.—Meantime, on the Continent, the next great progress after 1830 came with the revolutions of '48. A general explosion had been preparing; but again the signal was given by France. The Orleans monarchy had become reactionary; and the socialistic February revolution set up the Second Republic. March saw Metternich himself a fugitive, escaping from Vienna in a laundry cart, while thrones were tottering everywhere between Russia and Turkey on one side and England on the other. Even England trembled with a Chartist movement and the threat of an Irish rebellion. The kings of Holland, Spain, Denmark, and Sweden made constitutional concessions. In Germany and Italy there were complex movements, working (1) for constitutional liberty and social reform within the several states; (2) for the union of the fragments of the German race into a nation; and (3) for the independence of Italians, Slavs, and Hungarians, held in subjection by Austria.

The third movement resulted in wars, out of which Austria finally emerged triumphant; and her victorious army was a ready tool to restore absolutism at home. In Germany the undisciplined Liberals had wasted opportunity. Austria dispersed the Frankfort National Assembly, and, after humiliating unready Prussia at Olmütz, restored the old confederation (1850). A year later (1851) the *coup d'état* of Louis Napoleon closed the revolution in France and prepared the way for the Second Empire of the next year.

But there had been great gains. Feudalism and serfdom were gone forever, even from Austria. Sardinia, Prussia, and the minor German states kept their new constitutions. Switzerland had become a true federal republic upon the American type. Sardinia, by her sacrifices, and Prussia, in spite of the past mistakes of her timid government, were clearly marked out as

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the champions of Italy and Germany against Austria. Victor Emanuel of Sardinia recognized his mission to unite and free Italy; and Prussia, so recently shamed, had statesmen who would see that next time she should be ready.

Europe from 1850 to 1880.—The next 25 years (1850-75) saw not only the advance toward democracy in England, the victory of nationality and the abolition of slavery in the United States, the formation of the federal Canadian Dominion, on the American model, and the awakening of Japan under American constraint, but also a new federal German Empire, a united, constitutional Italy, a stable French republic, a constitutional Spain, and a constitutional, federal Austria-Hungary. The period was one of "blood and iron." Napoleon III., who had drawn England into the Crimean war (1854) to humiliate Russia, was himself drawn by the statesmanship of Cavour into the Austrian war of 1859 to help free Italy. Within a year after the resulting campaigns in Italy had closed, the American Civil War began; and before it ended, Bismarck had entered upon his trilogy of wars. In 1864 he robbed Denmark of the Schleswig-Holstein duchies, with the great harbor of Kiel for Prussia's projected navy, and so made trial of the new army he was at once to use (1866) in driving Austria out of Germany by the Six Weeks' War. The North German Confederation, then formed, was expanded into the German Empire by the Franco-Prussian war (1870-1), into which Bismarck next tricked French vanity and the despairing ambition of the decaying French government. These struggles completed also the unity of Italy. In 1866 Italy recovered Venetia from Austria, and in 1870, when France could no longer interfere, it at last marched its troops into its ancient capital, Rome. Even for conquered countries, during this period, did reform grow out of war. The Crimean catastrophe struck the chains from Russia's serfs; the shock of defeat in '59 and '66 woke Austria to constitutional progress; only when Germany shivered the sham of the Second Empire did France enter upon true republican life; and it was in the ashes of her old social system that our own South found regeneration.

Out of the Russian-Turkish war of 1877-8 a new group of Balkan nations was born, mainly Slav in blood, with at least the forms of constitutional government. But since 1871 political progress for the most part has been peaceful. The various monarchies of Europe, except Russia and Turkey, had already all adopted constitutions modeled upon the English government, though in none of them were the ministries so truly dependent upon popular will as in England. Indeed, in some states the formal constitutional monarchy really merges into a practical despotism. Progress in politics since 1871 has been of two kinds: (1) a growth in ministerial responsibility, and (2) rapid extension of the franchise toward a manhood basis. Actual administration, in most European countries, is still highly aristocratic; but in the matter of ultimate control democracy is generally triumphant, and it is training itself everywhere, by compulsory school systems, for the closer management of affairs.

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since 1880 require brief statement. France, longing to recover her lost provinces from Germany in a war of revenge, drew close to Russia. Bismarck offended Russia by supporting Austria in the Balkans. Italy was angered by the French seizure of Tunis in 1880. Thus new combinations of the powers appeared. In 1881, Germany, Austria, and Italy (all old enemies) leagued in the Triple Alliance; while a little later, France and Russia formally adopted a dual alliance. The Continent was thrown into two hostile camps, and has rested ever since under an armed peace. France became "the tail to the Russian kite." England, unwilling to join the Triple Alliance, as Bismarck wished, has been left in a position her statesmen have chosen to characterize as one of splendid isolation.

In the '90s, all these arrangements were threatened by the active appearance, in the field of international politics, of two non-European powers. The Chinese war of 1894 revealed Japan as a modern and powerful state; and the Spanish-American War (1898) made it apparent that the United States had abandoned its exclusively American policy. Moreover, since about 1880, European politics had been merging more completely than ever before in world politics. The questions at issue ceased to be Rhenish or Danubian, and became African and Asiatic. The 19th century, indeed, had been one of expansion of civilized powers, but that expansion had hardly been conscious of its own importance. The United States had quietly filled its borders from ocean to ocean with a homogeneous population. Russia had spread across northern Asia to the Pacific, and was reaching down in the Trans-Caspian region toward the Persian Gulf. And England had continued annexation of the keys to empire in waste spaces of the earth. These three were the world-powers. Far behind came France, with some important possessions in North Africa and some ancient claims in southeast Asia. Until 1884 Germany had no thought of colonial empire.

About 1880 a new, conscious greed for colonial territory seized Europe. Africa, some Pacific islands, and the helpless Asiatic empires of Persia, Turkey, Siam, and China were the only unappropriated lands. There followed a swift, peaceful division of Africa. In 1880, only patches here and there on the coast were European; in 1891, except for the native states of Abyssinia, Liberia, and Morocco, the continent was mapped out between European claimants. The three important African powers are England, France, and Germany, though Belgium, Spain, Portugal, and Italy are also represented. England is far in the lead. Her ambition has been to unite her two main possessions, in the Nile Valley and in South Africa, by acquiring intermediate territory; but the Congo Free State and German East Africa were thrust between too soon. France comes second in extent of territory; but, except for Algeria and Madagascar, her districts are less valuable than those of England or Germany. France would have liked to join her holdings on the east and west of the continent; but she found English territory thrust in between. German ambition was frustrated in similar manner. The three powers seem to have mutually stale-mated one another's attempts to dominate Africa.

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The occupation of Asia by European states has proceeded more slowly, but has moved with increasing rapidity in recent years. England, Russia, Japan, and France are the chief powers concerned, though Germany has shown an active disposition to take a hand in any partition, and though the commercial interests of the United States make it certain that that country will be an important factor in any further changes.

In 1894, Japan and China engaged in war over the control of Korea. With amazing rapidity, Japan overcame her bulky antagonist; but Russia, backed by France and Germany, stepped in to rob her of the fruits of her victory. Japan, owning not even one modern ship of war, was forced to yield—to spend all energies for the next 10 years in preparing for further conflict. Russia secured from China the right to extend her Siberian railroad through Manchuria, and in 1898 she also obtained the powerful fortress of Port Arthur. Germany and England then compelled China to grant them important districts, which, like the Russian acquisitions, seemed to command the heart of China and to doom that power to partition. In 1900 the Chinese resentment against “western barbarians” culminated in the Boxer massacres. The powers sent armies to rescue their beleaguered embassies at Peking; but, largely through the policy of the United States, no territorial indemnities were demanded. During the campaign, however, Russia occupied Manchuria, and, despite repeated solemn promises, it soon became plain that she meant to keep it. The powers apparently acquiesced; but when Russia in 1903 encroached also upon Korea, Japan foresaw danger to her own independence, and, in 1904, she began war. The struggle has been tremendous, almost beyond parallel; but Japanese victory has been swift and overwhelming, and has changed the whole face of world politics. Russian aggression in the East has been checked for a long period. See MANCHURIA; PORTSMOUTH, TREATY OF.

Summary.—The three mighty agents in the 19th century transformation have been democracy in politics and industry, humane sentiment in morals, and scientific progress. The first of these has been the main theme of the latter part of this article. The gentler spirit of recent society, likewise touched upon, has abolished slavery, ameliorated law, and brought about organized, zealous, and intelligent effort to lessen misery and crime. But perhaps the most marvelous phase of the “Wonderful Century” is the scientific advance. Since the primitive inventions of making fire, of the bow, of domesticating animals, of smelting iron, and of the alphabet, all the inventions of man up to the year 1800 probably count for less than those since that year. In civilized lands, life has been lengthened over a fourth, and the population of the civilized world has trebled. This larger amount of life has been lifted to a higher level. Wealth is more abundant; and the laboring masses, though still getting too little of it, get far more than formerly. The area of civilized life has been wonderfully expanded, but steam and electricity bind the most scattered portions together more closely than adjacent villages were joined in the near past. And this new

solidarity is not merely in material interests: it has its intellectual and moral side. There is a growing unity of sympathy and opinion.

The picture, of course, has its dark side. Crowded populations live and work under conditions of misery and disease and often of sin. Civilized nations show callous disregard for the rights of weaker or barbarous people. And over the civilized world itself there still broods the danger of annihilating war, more terrible because of the inventions of this scientific age.

Happily this survey may close with a chronicle of a great step toward removing this last danger. The Hague Conference of 1899, called in the interests of peace, did not find it possible to make any advance toward disarmament, but it did provide for a permanent international tribunal for arbitration between such nations as may choose to avail themselves of it. It is of supreme consequence that machinery is ready so that two nations at difference may escape war without loss of dignity, if they both desire. Even more significant and hopeful, however, is a long series of arbitration treaties between nations, two and two, beginning with the Anglo-French treaty of 1903. Despite the terrible Russo-Japanese war, the first years of the 20th century have seen remarkable progress toward the federation of the world.

Bibliography.—Within the space at command, no detailed bibliography is possible. Since the dawn of the scientific study of history, writers have shunned the attempt to cover the complex field of modern history except in co-operative “series.” Of such series the most important in English are ‘The Cambridge Modern History,’ edited by Ward (1903, 12 vols., of which only 5 have appeared by 1905); and ‘Periods of European History,’ edited by Hassall (1890-2, 8 vols., of which the last 5 belong to our period). Andrews’ ‘Historical Development of Modern Europe’ (1896), Fyffe’s ‘Modern Europe to 1878’ (1884), and Seignobos’ ‘Europe Since 1814’ (1899) deal with the 19th century. Cunningham’s ‘Western Civilization’ (1900), and McVey’s ‘Modern Industrialism’ (1904) treat special phases. For further references the reader may consult the special bibliographies at the close of the articles on leading countries and movements. West’s ‘Modern History’ (a high-school manual, 1904) in an appendix gives a classified bibliography of 150 standard English works.

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History, Logic of. The relation of history to the problems of the philosopher has been mostly confined to those questions which are treated in the philosophy of history. The object of this discipline is to interpret the meaning of mankind’s historical development and to comprehend the progress of humanity in the setting of a metaphysical system. It is only in recent times that philosophy has recognized clearly the importance of an entirely different relation. If the philosopher studies in the science of logic the ways of thought and the special methods by which the different special sciences are able to reach the truth it must be logical and thus, ultimately, a philosophical task to examine the methods of historical investigation. The special

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schemes of the historian's technique belong to historical science proper. But as soon as the attitude which the historian has to take towards the world is in question, we stand before a logical problem which is most nearly connected with the general problem of the meaning of truth. A rich literature devoted to this circle of problems has grown up during the last decade, partly through the activity of philosophers and psychologists, partly from the interests of historians and economists themselves.

Of course, it is possible to take the skeptical attitude and to deny the existence of a particular problem here. We can say that all science has the same kind of task, and that the logical problems are thus not other for history than for the natural sciences. Yet this attitude may lead to two different standpoints. The first is the most popular one. From that it would appear that history is not a real science at all. It collects a mass of material just as the zoölogist collects his specimens; but that kind of treatment which makes zoölogy a real science, the study of the common characteristics and of the underlying laws, is not in question for the historical material. Instead of this an art enters into play, the art of historical presentation. The works of the great historian are thus in first line works of art parallel to the great epic narratives, with only the difference that the epic poems follow the lines of imagination while the historian reconstructs the facts as they may have happened. Scientifically history would thus stand on the lowest level, as a mere collection of facts without that real scientific treatment which makes the value of the other sciences. The best which can be hoped, then, is that it may be brought to a kind of scientific height by introducing as much as possible the results of other sciences such as physics, biology, anthropology, geo-physics, etc., into the explanation of historical happenings. The influences of climate, of race disposition, of technical inventions, and so forth, then become predominant in the scholarly treatment of historical events. It may be said that this low opinion of the pure scientific character of history has been prevalent throughout the whole history of science.

But those who consider the natural sciences as the only type of real scientific work may be led, and have been led frequently in recent times to still another standpoint. They may say that history has the greatest possibility of being a full-fledged science. The only step it has to take is that from the merely descriptive to the law-seeking attitude. The real task of the historian, they say, would be to find the common features which belong to the growth of every nation and to the political and social, artistic and scientific, economic and religious movement of the different periods and of the different communities. As long as isolated processes are described, history indeed remains on a pre-scientific level, but as soon as we recognize characteristic types of development, we reach general laws like those of the biologist or the chemist. The interest concentrates itself then on the psychological factors which moulded the fate of the nations, and especially the life of the masses becomes a true historical agency. That which is unique then becomes insignificant and accidental as compared with the great typ-

ical processes which repeat themselves under similar conditions in the most different countries. A kind of natural science of historical nations thus becomes the logical goal.

Those modern movements, however, which have forced the problems of the logic of history to public attention object to both these standpoints because they refuse to admit the first presupposition. They deny that the natural sciences are the only type of a real science. They claim, rather, that this is a prejudice which has been suggested to the world by the overwhelming influence of the Aristotelian logic on the one side, and the impressive triumphs of natural science on the other. They hold that there exist two types of scientific thought in principle commensurable, and that the historical way of thinking is in its importance and in its logical right perfectly coördinate with naturalistic thought. Yet here again a variety of standpoints have been taken.

The simplest presentation of this doubleness of logical method is offered by those who hold that the whole separation is to be deduced from the doubleness of the logical attitude. They say that we can take with reference to everything in the universe either the attitude of interest in the general law or the attitude of interest in the particular thing. The one interest can never be substituted for the other. In the one case the particular object is for us only a sample illustration for a general relation. We seek the law which expresses that relation and inhibits therefore the interest in the special chance case which is before us. That is the attitude of the naturalist. On the other hand we may give our whole attention to the particular object before us in its uniqueness, and there is no doubt that our practical interests of life force on us just this attitude. Our earth may be astronomically not more important than any other planet, but our practical interest belongs to this planet alone. Our friends may be to the biologist not more instructive than any other group of organisms, but for our friendship those particular men have their unique position and cannot be replaced by other chance copies. To develop systematically this interest in the particular is the function of the historian, and anything which has its particular existence is possible historical material. Yet it is evident that no science can have the task of describing every particular pebble on the beach. There must be a principle of selection, and this is given in the reference to our values. The men who have relation to that which is valuable in the world, to the development of state and law, of art and science and religion, are to be selected for the historian's account. And this ultimate reference to values binds the particular objects together, while it is evident that the law of natural science brings the facts under a point of view under which they have no special value at all, but are indifferent objects of theoretical observation. The antithesis is thus complete. The naturalist seeks the general, the historian seeks the particular. The naturalist refers everything to the law, the historian everything to the value. Both groups of interest create logically independent systems of knowledge. Their difference is thus in no way a difference of material, as there is nothing in the world which cannot be considered from

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both points of view. The sun which the astronomer studies in relation to the astronomical laws as a chance case of a general relation which holds for myriads of suns, may be at the same time the object of interest for those who ask about the development of this one particular sun which gives us light. And on the other hand, even the Napoleon of the historian may be brought under the laws of biology from the standpoint of the naturalist.

Others who welcome this sharp separation feel doubtful whether it is really the logical attitude which determines the difference and not the content. They claim that it is not true that natural science has to deal with laws only. Natural science may very well give its attention to particular objects too, and the development of our sun or our earth or our mankind is not history but natural science. The true difference, they say, lies rather in the doubleness of the objectifying and the subjectifying attitude.

The sun and earth are for us all objects, but men and their work can be considered in a double way. We can consider our neighbors as objects, as phenomena which we describe and explain, but we can consider them also as subjects of will which we understand and interpret and appreciate, and this doubleness of attitude reaches over the whole of mankind. Wherever there is will, there the object can be taken as a subject and it is claimed that the work of the naturalist is the study of the world in so far as it is conceived as a system of objects, while the study of the historian is the world in so far as it is conceived as a system of will relations. Only subjects of will would thus be able to enter into history at all. And the task of the historian is to understand the systematic relations between the purposive actions. The naturalist starts from the objects of his perception and seeks their causes and their effects. The historian starts from those will demands which reach him as the political, legal, artistic, scientific, economic, religious demands of his social world, and he seeks to interpret them by connecting them with the purposes of the past. The naturalist explains, while the historian interprets intentions and links the will purposes into a connected unity.

Bibliography.—Windelband, 'Naturwissenschaft und Geschichte'; Simmel, 'Probleme der Geschichtsphilosophie'; Rickert, 'Grenzen der naturwissenschaftlichen Begriffsbildung'; Münsterberg, 'Psychology and Life'; Lamprecht, 'What is History?'

HUGO MÜNSTERBERG,

Professor of Psychology, Harvard University.

History, Great Events of. The following list gives only those important events which have affected or changed the subsequent history of nations. The cross references will refer the student to the special information concerning these epoch-making occurrences, and the following special articles may also be consulted: HISTORY, ANCIENT; MEDÆVAL; MODERN; WARS OF THE WORLD; PEACE TREATIES; REPUBLICS, HISTORY OF; EXPLORATIONS IN THE 19TH CENTURY; POLAR RESEARCH; JUDAISM—JEWISH HISTORY; CRUSADES; CROMWELL; GUNPOWDER; THIRTY YEARS' WAR; SEVEN YEARS' WAR; NAPOLEON; WATERLOO, BATTLE OF; CRIMEA; AMERICA, DIS-

COVERY AND COLONIZATION OF; DISCOVERIES OF AMERICA TO 1562, SPANISH AND PORTUGUESE; COLONIAL WARS IN AMERICA; NAVY OF THE UNITED STATES, HISTORY OF; UNITED STATES, WARS OF THE; DECLARATION OF INDEPENDENCE; SLAVERY IN THE UNITED STATES; CONFEDERATE STATES OF AMERICA; MONROE DOCTRINE; UNITED STATES—THE AMERICAN REVOLUTION; THE WAR WITH FRANCE; WAR OF 1812; MEXICAN WAR; SLAVERY; CAUSES OF THE CIVIL WAR; RECONSTRUCTION; WAR WITH SPAIN; ETC.; TREATIES OF THE UNITED STATES WITH FOREIGN NATIONS; THE EASTERN QUESTION; THE OREGON QUESTION; DICTATORSHIPS IN LATIN-AMERICA; EMANCIPATION IN LATIN-AMERICA; PEKING, SIEGE OF; BOERS; SOUTH AFRICAN WAR; RIEL'S REBELLION; ETC.

- B. C.
 1277 Exodus of the Children of Israel from Egypt.
 1111 Mariner's compass (q.v.) discovered.
 753 Rome (q.v.) founded.
 603 Geometry and Maps (qq.v.) first used.
 551-479 Confucius (q.v.) flourished.
 490 Battle of Marathon.
 538 Fall of Babylon (q.v.).
 336 Accession of Alexander (q.v.): Grecian Empire.
 68-44 Cæsarian era; Britain invaded; Gaul conquered.
 A.D.
 33 The Crucifixion of Christ (q.v.).
 451 Battle of Chalons.
 570-632 Mohammed (q.v.) flourished.
 800 Charlemagne (q.v.), Emperor of the West.
 967 Egypt conquered by the Turks.
 1066 Battle of Hastings in England.
 1095 Crusades (q.v.) in Holy Land begun.
 1234 Gunpowder (q.v.) first used by Genghis Khan.
 1453 End of the Roman Empire in the East.
 1455-85 War of the Roses in England.
 1492 Columbus discovered America.
 16th Cent. Period of Reformation (q.v.) in Europe.
 1588 Destruction of the Spanish Armada.
 1618-1648 Thirty Years' War (q.v.).
 1619 Beginning of Slavery (q.v.) in America.
 1642 Beginning of the Civil War in England.
 1627 Barometer and Thermometer (q.v.) devised.
 1648-52 Civil War of the Fronde in France.
 1642-1724 Newton (q.v.) discovered gravitation.
 1713 Peace of Utrecht ending War of Spanish Succession (q.v.).
 1741-48 War of the Austrian Succession.
 1756-63 The Seven Years War (q.v.).
 1776 Declaration of Independence (q.v.).
 1789-1802 French Revolution.
 1804-1815 Napoleon (q.v.) Emperor of France.
 1812-14 War of 1812 (q.v.).
 1815 Battle of Waterloo (q.v.).
 1819 Electro-Magnetism discovered.
 1821-29 Greek War of Independence.
 1831-39 Belgian war of Independence.
 1845-48 Mexican War (q.v.) with the United States.
 1853-55 Crimean War.
 1857-59 Indian Mutiny and War.
 1861-65 Civil War (q.v.) in United States.
 1863 Battle of Gettysburg (q.v.).
 1866 Laying of first Atlantic Cable.
 1868-99 Cuban War of Independence.
 1870-71 Franco-Prussian War (q.v.).
 1877-78 Russo-Turkish War.
 1883-84 War in the Sudan.
 1894 War between Japan and China.
 1895 Roentgen discovery of X-rays (q.v.).
 1897 War between Turkey and Greece.
 1898 Spanish-American War began.
 1898 Hawaii (q.v.) annexed to the United States.
 1899 Peace Conference at The Hague (q.v.).
 1899-1900 War between England and Boers.
 1902 First Anglo-Japanese Alliance. See ANGLO-JAPANESE TREATIES.
 1903 Panama Canal treaty signed. See PANAMA CANAL.
 1903 Pacific Cable completed.
 1904-5 War between Japan and Russia, terminated 1 Sept. 1905 by Treaty of Portsmouth (q.v.). See MANCHURIA.
 1905 Second Anglo-Japanese Alliance (q.v.).
 1906 Earthquake and fire, San Francisco, Cal. See EARTHQUAKE.
 1908 Restoration of the Constitution in Turkey.
 1910 Republic established in Portugal.

Hitchcock, hich'kōk, Charles Henry, American geologist: b. Amherst, Mass., 23 Aug. 1836. He was a son of Edward Hitchcock,

HITCHCOCK—HITTELL

geologist (q.v.). He was graduated from Amherst College in 1856, was assistant State geologist of Vermont in 1857-61, State geologist of Maine 1861-2, and of New Hampshire 1868-78. In 1868 he was appointed professor of geology in Dartmouth College. In connection with his survey of New Hampshire, he maintained, during the winter of 1870, a meteorological station on Mount Washington, the earliest high-mountain observatory in the United States. He became known as a compiler of geological maps, and for his investigations regarding the geology of the crystalline schists, ichnology, and glacial geology. The location of the terminal glacier in the United States was first suggested by him. He was a founder of the Geological Society of America, and in 1883 president of the American Association for the Advancement of Science. His publications include: 'Elementary Geology' (1861, with E. Hitchcock); 'Mt. Washington in Winter' (1871); and a 'Report on the Geology of New Hampshire' (1873-8), with folio atlas, his most valuable work.

Hitchcock, Edward, American Congregational clergyman and geologist: b. Deerfield, Mass., 24 May 1793; d. Amherst, Mass., 27 Feb. 1864. He was principal of the academy in his native place 1815-18; pastor of the Congregational Church in Conway, Mass., 1821-5; professor of chemistry and natural history in Amherst College 1825-45, and president of Amherst College and professor of natural theology and geology 1845-54. He was appointed State geologist of Massachusetts in 1830, of the First District of New York in 1836, and of Vermont in 1857. In 1850 he was commissioned by the government of his native State to examine the agricultural schools in Europe. His life was in a great measure identified with the history of Amherst College. Connected with it almost from the beginning, in his own presidency he procured for it buildings, apparatus, and funds to the amount of \$100,000, doubled the number of students, and established it on a solid pecuniary as well as literary and scientific basis. His earliest scientific publications were the 'Geology of the Connecticut Valley' (1823), and a 'Catalogue of the Plants within Twenty Miles of Amherst' (1829). Later works were: 'Lectures on Diet, Regimen, and Employment' (1831); 'Lectures on the Peculiar Phenomena of the Four Seasons' (1850); 'Reports on the Geology of Massachusetts' (1833-35-38-41); 'Illustrations of Surface Geology' (1857); 'Elementary Geology,' which passed through 25 editions in America, and one third of that number in England; 'Religion of Geology and its Connected Sciences' (1851); and 'Reminiscences of Amherst College' (1863). Dr. Hitchcock suggested as well as executed the geological survey of Massachusetts, the first not only in the long series of scientific surveys in the United States, but the first survey of an entire State under the authority of government in the world. He was the first to give a scientific exposition of the fossil footprints of the Connecticut Valley, and with him ichnology as a science began.

Hitchcock, Ethan Allen, American soldier: b. Vergennes, Vt., 18 May 1798; d. Sparta, Ga., 5 Aug. 1870. He was a grandson of Ethan

Allen (q.v.), and was graduated at West Point in 1817, entering the corps of artillery as a third lieutenant. In 1829 he became the military commandant of the corps of cadets, in which office he continued until 1833. He served in Florida against the Indians, and in the war with Mexico, where he received two brevets, one as colonel and another as brigadier-general. In 1855 he printed for private circulation a pamphlet in support of his opinion that genuine alchemy was not an art for making gold, but that the alchemists were students of man, whose perfection was symbolized by their "philosopher's stone." He subsequently published: 'Remarks upon Alchemy and the Alchemists' (1857); 'Swedenborg a Hermetic Philosopher' (1858); 'Notes on the Vita Nuova of Dante' (1866).

Hitchcock, Ethan Allen, American politician: b. Mobile, Ala., 19 Sept. 1835; d. Washington, D. C., 9 April 1909. Was in mercantile business at St. Louis, Mo., 1855-60, then went to China to enter a commission house, of which firm he became a partner in 1866. In 1872 he retired from business, in 1874 returned to the United States, and in 1874-97 was president of several manufacturing, mining, and railway companies. He was appointed envoy extraordinary and minister plenipotentiary to Russia in 1897, and in February 1898 ambassador extraordinary and minister plenipotentiary, the first ambassador accredited from the United States to the court of Russia. In 1898 he was nominated and confirmed as secretary of the interior, and held that position till 4 March 1907.

Hitchcock, James Ripley Wellman, American art critic: b. Fitchburg, Mass., 3 July 1857. He was graduated at Harvard in 1877, and was art critic of the *New York Tribune* 1882-90. He has written: 'The Western Art Movement' (1885); 'A Study of George Inness' (1885); 'Madonnas by Old Masters' (1888), the text to photogravures; 'The Future of Etching'; 'Some American Painters in Water Colors'; 'Etching in America'; 'Notable Etchings by American Artists'; etc.

Hitchcock, Roswell Dwight, American Congregational clergyman: b. East Machias, Maine, 15 Aug. 1817; d. Somerset, Mass., 16 June 1887. Graduated from Amherst College in 1836 and from the Andover Theological Seminary in 1838, he also studied at Halle and Berlin (1847), in 1845-52 was pastor of the First Congregational Church at Exeter, N. H., and in 1852-5 professor of revealed religion in Bowdoin College. In 1855 he became professor of church history at the Union Theological Seminary, of which institution he was elected president in 1880. He became president of the Palestine Exploration Society in 1871, and vice-president of the American Geological Society in 1880. An editor of the 'American Theological Review'; he wrote: 'The Life, Character, and Writings of Edward Robinson' (1863); 'Complete Analysis of the Holy Bible' (1869); and 'Socialism' (1879). With Eddy and Madge, he compiled 'Carmina Sanctorum' (1885); and 'Eternal Atonement,' a volume of sermons, appeared in 1888.

Hittell, Theodore Henry, American historian: b. Marietta, Pa., 5 April 1830. In 1852

HITTITES—HOAR

he was admitted to the bar at Cincinnati, in 1855 removed to California, in 1855-61 was connected with the *Bulletin and Times* of San Francisco and from 1862 practised law. He was State senator in 1880-2. He wrote a 'History of California,' his chief work; and compiled 'The General Laws of California,' known as 'Hittell's Digest,' and 'Hittell's Codes and Statutes of California.'

Hittites, hit'its, the name of several peoples mentioned in the Old Testament, and in Egyptian and Assyrian inscriptions. In the Old Testament the name is applied to three more or less distinct groups, namely, the "children of Heth" from whom Abraham purchased a burying-place; a people or group of peoples which inhabited Palestine before the Hebrews and resisted their invasion; a kingdom in northeastern Syria, with which Solomon formed marriage alliances. The first group dwelt around Hebron in southern Palestine, and the Hittites mentioned in connection with David, of whom the chief was Uriah, may be their descendants. The second group of Hittites dwelt among the mountains of central Palestine, and the third group, united in some sort of empire, had their seat still farther north. Of this Hittite empire we learn more from the Egyptian and Assyrian records than from the Old Testament. The Heta, according to the hieroglyphic inscriptions, offered a vigorous resistance in northern Syria to the Egyptian king Thutmosis III. (18th dyn.: c. 1560 B.C.), and to his successors of the 19th dynasty, Sethos I., Rameses II. and III., c. 1350-1200 B.C. Carchemish, Kadesh, and Hamath were among their chief cities. The cuneiform inscriptions contain notices of a people called Hatti who frequently fought with the Assyrians from the time of Tiglath-pileser I. (c. 1100 B.C.) till that of Sargon II. (721-704 B.C.), after which they are no more heard of. The Hittite monuments and inscriptions which have been found in Carchemish, Hamath and neighboring places, as well as throughout Asia Minor, appear to belong to the Assyrian period.

Hittorf, Jacques Ignace, French architect: b. Cologne 1792; d. 1867. He studied his profession in Paris and was employed on many public buildings and places, doing work on the Bois de Boulogne, the Champs-Élysées and the Church of Saint Vincent de Paul. Among his publications may be mentioned 'Architecture Antique de la Sicile'; 'Architecture Moderne de la Sicile' and 'Architecture polychrome chez les Grecs.'

Hitzig, Ferdinand, German theologian: b. Hauringen, Baden, 23 June 1807; d. Heidelberg, 22 Jan. 1875. He was educated at Heidelberg, Halle and Göttingen. He went to Zurich in 1833 as professor of theology, where he remained until 1861, when he returned to Heidelberg. He was quite a voluminous writer on the Old Testament, composing commentaries on the Minor Prophets (1838); Jeremiah (1841); Ezekiel (1847); Ecclesiastes (1847); Daniel (1850); Song of Solomon (1855). He made a translation of the Psalms in 1835.

Hive-bee. See HONEY-BEE; BEE-CULTURE.

Hives. See URTICARIA.

Hoactzin, hō-äkt'zin or -äk'zin, a singular South American bird (*Opisthocomus cristatus*) of the size of a pheasant. It is brown streaked

with white, and the head has a movable crest. It is interesting principally from the extraordinary way in which the fledglings, as soon as they leave the nest (in a tree), scramble about the branches by aid of their wings used like hands, by reason of the fact that they have a temporary claw on both the index and pollex. The food of these birds is mainly leaves and fruit; and a strong musky odor is given off by the adults, so that in British Guiana they are called "stinking pheasants."

Hoadley, hōd'li, George, American lawyer: b. New Haven, Conn., 31 July 1826; d. Watkins, N. Y., 27 Aug. 1902. He was graduated at Hudson College, Ohio, in 1844; studied law at Harvard, was admitted to the bar in 1847 and joined a law firm in Cincinnati of which Salmon P. Chase (q.v.) was the leading member. He was appointed judge of the superior court of Cincinnati in 1859, and re-elected in 1864. He took a leading part among the "Barnburners" (q.v.), was a War Democrat, and during the War joined the Republican party. He defeated Foraker in a contest for the governorship of Ohio in 1883, but failed of re-election in a struggle against the same candidate.

Hoadly, Benjamin, English Anglican prelate: b. Westerham, Kent, 14 Nov. 1676; d. Chelsea 17 April 1761. He was educated at Cambridge; took orders in 1700, and after being settled in London distinguished himself in controversy with Bishop Atterbury and others. A staunch Low-Churchman, he was appointed bishop of Bangor in 1715. A sermon preached before the king of 1717 gave rise to the "Bangorian Controversy" regarding the divine authority of the king and the church. He was translated to the see of Hereford in 1721, to Salisbury in 1723, and Winchester in 1734.

Hoang-ho. See HWANG OR HOANG-HO.

Hoar, Ebenezer Rockwood, American jurist: b. Concord, Mass., 21 Feb. 1816; d. there 31 Jan. 1895. He was the son of Samuel Hoar (q.v.), was graduated at Harvard (1835), and subsequently admitted to the bar. He rose to be judge of the court of common pleas (1849), judge of the State supreme court (1859), and attorney-general of the United States (1869), and was a member of the Joint High Commission that framed the Treaty of Washington (1873-5).

Hoar, George Frisbie, American statesman: b. Concord, Mass., 29 Aug. 1826; d. Worcester, Mass., 30 Sept. 1904. Senator Hoar's paternal and maternal inheritance was very remarkable. His grandfather was an officer in the Revolutionary army and his father, Samuel Hoar, was one of the ablest lawyers and statesmen of his time, a member of Congress from Massachusetts, and a man of great learning and force of character. Senator Hoar's mother was a daughter of Roger Sherman, a signer of the Declaration of Independence. He was graduated from Harvard in 1846, studied law there, and began his law practice in Worcester, Mass. The young man was early attracted to politics and identified himself with the Free Soil party, and his purpose in 1895—so characteristic of his whole career—is thus stated by himself: "All of us Free Soilers were drawn into politics by a great issue. It

HOAR

was to prevent slavery being extended into the new territory between the Mississippi and the Pacific. We were all ardent advocates of freedom. The party and the movement were new, and we were stirred by high ideals. Among the young men who went into the new movement at that time were my brother, Ebenezer Hoar, Erastus Hopkins, Anson Burlingame, Whittier, Lowell, Longfellow, and many others that became well known. There were no offices to gain. There was simply a cause to work for. In the campaign of 1850 the Free Soilers did not carry a single State, only a few Congressional districts." He was a member of the Republican party from the first, and in 1852 was elected to the Massachusetts house of representatives; in 1857 to the State senate. In the intervals of service he practised law. In 1860 he was city solicitor. He presided over the Republican conventions in Massachusetts in 1871, 1877, 1882 and 1885; was a delegate to his party's national conventions in 1876, 1880 (the chairman in that year), 1884, 1888, 1892 and 1896. He served in the national House of Representatives for four successive Congresses, 1869-77, elected as a representative of the Worcester district; in 1877 he was elected to the Senate, and was re-elected in 1883, 1889, 1895, and 1901, serving his country continuously as a national legislator since 1869, having represented Massachusetts for a longer period in the national Congress than any other representative from that State. In 1876, he was one of the managers on behalf of the House in the Belknap impeachment trial, and was also a member of the Electoral Commission (q.v.), which decided the Hayes-Tilden contest for the Presidency, the other Republican members of that famous body being Senators George T. Edmunds, O. P. Morton and Frederick T. Frelinghuysen, and Representative James A. Garfield. In the Senate he was chairman of the judiciary committee, and of the committee on privileges and elections, and a member of other important committees. He was known as the old man eloquent of the Senate, having served in that body for 37 years and taken part in all the great questions that have been before the country during that time. He was a determined opponent of the retention of the Philippines, and independent enough to state his views fearlessly in the support of his own theory that the United States should leave the islands to the control of the Filipinos and prevent interference from foreign nations, but his honesty and sincerity were unquestioned and he always retained the confidence of his party and the respect of all. He was a thorough American and believed in the future of his country and placed its welfare above all personal considerations. "The lesson which I have learned in life, which has been impressed upon me daily and more deeply as I grow old," he said in his autobiography, "is the lesson of Good Will and Good Hope. I believe that to-day is better than yesterday, and that to-morrow will be better than to-day. I believe that, in spite of many errors and wrongs, and even crimes, my countrymen of all classes desire what is good, and not what is evil."

Senator Hoar was an idealist, and was not to be turned aside, even by his loyal love of party, from following his sincere convictions. He demanded justice for the negroes and the

Indians, openly declared his sympathy for Cuban and Filipino, and as firmly opposed religious intolerance in Massachusetts because his actions were controlled by reasons which he considered were founded in righteousness and truth, and therefore not subject to change.

Senator Hoar was a man of considerable scholarship and took great delight in literary and historical studies. He was a member of several historical and scientific societies, and took much interest in their work. He was president of the American Historical Society, president of the American Antiquarian Society, regent of the Smithsonian Institution in 1880, and trustee of the Peabody Museum of Archaeology. He received the degree of LL.D. from the College of William and Mary, Amherst, Yale and Harvard. In 1903 he published 'Autobiography of Seventy Years,' which first appeared in 'Scribner's Magazine' as a serial. The same year, in a speech in his home city of Worcester, Senator Hoar, as if in anticipation of his approaching dissolution, thus summed up the creed of his career:

"If my life has been worth anything, it has been because I have insisted, to the best of my ability, that these three things—love of God, love of country, and manhood—are the essential and fundamental things, and that race, color, and creed are unessential and accidental."

Although 78 years of age, he was in good health until the death of his beloved wife in 1903; their devotion had led many to predict that neither would long survive the other. Senator Hoar was taken seriously ill in June 1904, but lingered until 30 September, when he died at Worcester, Mass.

His death was the occasion of a remarkable display of panegyric in the press of both Republican and Democratic parties. It possessed the peculiar quality of reconciliation, one party regretting what the other considered his noblest quality. The only flaws in his judgment, said the Republican press, were his disagreements with the party leaders on the Philippine and Panama issues; but to the Democratic press his noble loyalty to the right on these occasions was convincing proof of his lofty statesmanship. The Democratic press regretted his inability to see any good in their party, while to Republican journals his virtue redeemed his errors of judgment on the matters of party policy.

One journal said: "As long as the confidence and affection of all the people are given to such a man, it is foolish and false to assume that the old standards are departing and the old ideals becoming broken. The people still know a man when they see him. Still they respect and honor the statesman who loves the republic better than he does himself, who never falters in his service, to whose fingers gold does not cling, and whose never-forgotten ideal is the people's welfare. While they honor such qualities above all others, pure and able statesmen will continue to come to their service," sentiments which were summarized in Ex-President Cleveland's statement that "Senator Hoar's ability, his high-mindedness, and his freedom from political trickery, furnish an example of a useful life which may well be imitated by all those entrusted by their countrymen with public duties."

GEORGE EDWIN RINES,

Editorial Staff 'Encyclopedia Americana.'

Hoar, Samuel, American lawyer and legislator: b. Lincoln, Mass., 1778; d. 1856. He was graduated at Harvard in 1802 and three years later entered upon a highly successful career as a lawyer. He served two terms as a State senator and was chosen by the Massachusetts legislature to challenge the constitutionality of certain laws in South Carolina relating to the imprisonment of free negroes. He was subsequently excluded from South Carolina courts by the State legislature.

Hoarhound. See HOREHOUND.

Ho'bart, Garret Augustus, American lawyer and politician: b. Long Branch, N. J., 1844; d. Paterson, N. J., 2 Nov. 1899. He was graduated at Rutgers College, New Jersey, in 1863, and admitted to the bar in 1866. At Paterson, where he made his home till his death, he enjoyed a successful law practice. He became successively city attorney, prosecuting attorney for Passaic County, a member of the State Assembly 1873-8, and of the State Senate 1879-85. During his several terms he was speaker of the Assembly and president of the Senate. In 1896 he was nominated at St. Louis for vice-president on the ticket with William McKinley, whose intimate friend he was, and was elected to that office.

Hobart, George Vere, American journalist, playwright, and author: b. Cape Breton, N. S., 16 Jan. 1867. He was educated in Nova Scotia, later coming to the United States as a telegraph operator for the United Press. He became editor of the Cumberland Sunday 'Scimitar,' later writing for the 'Herald,' *Evening News* and 'American' of Baltimore. Since then he has been writing for the Hearst newspapers the humorous sketches, 'John Henry' and 'Dinkelspiel.' He has written 'Many Moods and Many Meters' (1899), and 'Li'l Verses for Li'l Fellers' (1903), both poems; the 'Dinkelspiel' series (1900); the 'John Henry' books (1901-4), and the plays, 'After Office Hours,' 'Miss Print,' 'Hodge, Podge & Co.,' 'Sally in Our Alley,' etc.

Hobart, John Henry, American Protestant Episcopal bishop: b. Philadelphia 14 Sept. 1775; d. Auburn, N. Y., 10 Sept. 1830. He was educated at the College of Philadelphia (now the University of Pennsylvania), and the College of New Jersey (now Princeton), and after trying commercial life in his brother-in-law's counting house, went back to Princeton as a tutor for two years, and was ordained deacon in 1798 and priest in 1801. After brief periods of pastoral service in Pennsylvania, New Jersey, and Long Island, he became assistant in Trinity Parish, New York, where he remained until his elevation to the episcopate, combining with his other duties a prominent share in the legislative councils of the church, as deputy to the General Conventions of 1801 and 1804, and secretary to the House of Deputies in the latter year. In 1811 he was consecrated as bishop-coadjutor in the diocese of New York, and upon the death of Bishop Moore in 1816, succeeded him both in the full charge of the diocese and in the rectorship of Trinity Church. He also gave provisional episcopal care at different times to New Jersey and Connecticut. He was very active in promoting the establish-

ment of the General Theological Seminary, and upon its location in New York became professor of pastoral theology. Hobart College also owed much to him, a debt recognized by the taking of his name, when, in 1852, the original title of Geneva College was changed to Hobart Free College. He wrote or edited a number of theological works, some of which, especially his 'Companion for the Festivals and Fasts' (1805), reached several editions. His 'Apology for Apostolic Order' (1802) is still used as a textbook.

Hobart, the capital of Tasmania, and up to 1881 called HOBART TOWN, is situated at the foot of Mount Wellington (4,166 feet high), on the Derwent River, 12 miles from its outlet in Storm Bay on the south coast. It has handsome public buildings, including government house, the government offices, parliament houses, Episcopal and Catholic cathedrals. There are important domestic manufactures, and in connection with its considerable shipping interests, a fine harbor with modern accommodations. Hobart is connected by rail with Launceston. Pop. about 31,400.

Hobart College, a Protestant Episcopal institution, located at Geneva, N. Y. In 1825 it was chartered as Geneva College; but in 1852 the name was changed to Hobart Free College, and in 1860 to Hobart College. Bishop Hobart (q.v.) had aided the school by advice and by money. An endowment from Trinity Church, New York, had greatly assisted the institution. The college offers scholarships and prizes to worthy students, and the departments are all well sustained. The courses lead to the degrees of A.B., B.S., and Ph.B. There are about 44,000 volumes in the library. In 1910 the school had 24 professors and instructors and 100 students. The graduates number nearly 1,600.

LANGDON C. STEWARDSON,

Registrar.

Hobart Pasha, AUGUSTUS CHARLES HOBART-HAMPDEN, third son of the Earl of Buckinghamshire, English sailor: b. Waltham-on-the-Wolds, Leicestershire, 1 April 1822; d. Milan, Italy, 19 June 1886. He entered the English navy as midshipman 1836 and retired as captain at the conclusion of the Crimean War in 1863. During the American Civil War he took the name of "CAPTAIN ROBERTS" and was given command of a blockade runner, an account of which is to be found in his 'Sketches of My Life' published posthumously. In 1867 he entered the Sultan's service, reorganized the Turkish navy, and fought the Russians on the Black Sea in the War of 1877-8. He was made Pasha (1869) and marshal of the Turkish Empire (1881).

Hobbema, Meindert, mīn'děrt hōb'ē-mā, Dutch landscape painter: b. Amsterdam, 1638; d. there 7 Dec. 1709. He was considered, next to J. Ruysdaal, the best of the Dutch landscape-painters, and as a colorist reckoned even superior to Ruysdaal. The figures in his landscapes are painted mostly by Berchem, Van de Velde, Lingelbach, and J. Van Loo. His paintings consist chiefly of forest scenes, ruins, villages, etc. Some of the most celebrated works of this master are to be found in public or pri-

HOBBS

vate galleries in France, Germany, and Holland. His greatest painting is 'A View in Holland,' with figures painted by Adrien van de Velde.

Hobbes, John Oliver. See CRAIGIE, PEARL MARY TERESA.

Hobbes, Thomas, English moralist, philosopher, and political scientist: b. within the borough of Malmesbury, Wiltshire, 5 April 1588; d. Hardwicke, Derbyshire, 4 Dec. 1679. Thomas Hobbes is eminent as writer on the theory of government, on psychology, and on metaphysics, and as master of a vigorous and picturesque English style. He was born in the year of the Spanish Armada, 1588, and lived to be 91 years old, active to the end in mind and in body. He was the son of a poor English vicar, was educated by his uncle, a prosperous glover, and spent the last five of his student years at Magdalen College, Oxford. The Oxford of that period was given over to a restricted and arid scholasticism, barring out mathematics, for example, as a black art; and Hobbes retained through life a vivid memory of the pedantry and narrowness of the Oxford of his youth. At the end of these student years, in 1608, he was employed by Cavendish, afterwards Earl of Devonshire, as tutor to his son; and he remained for the next 20 years in the service of this same great family and throughout his life, in close and friendly connection with it. For two years he traveled with his pupil on the continent, and then followed 18 years in England—a service terminated only by the death of his former pupil and constant friend, the second Earl. During these years, Hobbes devoted himself to classical study, which bore fruit in his vigorous translation of Thucydides, published in 1628. The three succeeding years were spent on the Continent, at first in travel with another English youth, later in the eager study, mainly at Paris, of mathematics and natural science. Hobbes himself tells us with what astonishment and delight he first, in 1628, when he was 40 years old, saw and read Euclid's 'Elements.' In 1631 he became tutor to the third Earl of Devonshire, son of his late patron and first pupil. With him he made, in 1634, a third continental journey, learned to know Galileo during his sojourn in Italy, and was admitted, in Paris, to the fellowship of a group of mathematicians and scientists. He must have been pondering on problems of politics and of psychology in the intervals of his study of physics and geometry, for his next book, which circulated in manuscript as early as 1640, set forth his theory of human nature and of the body politic. The publication even privately of this doctrine brought its author into prominence and strongly influenced the course of his life.

The psychology of Hobbes forms the basis both of his political and of his metaphysical doctrine. He distinguishes the 'cognitive (or conceptive)' faculty from the 'motive' faculty of the mind, and recognizes five senses, to which he adds 'a sixth sense, but internal, * * * commonly called remembrance.' He defines the affective consciousness as 'motion about the heart,' which 'when it helpeth is called pleasure * * * but when it hindereth the vital motion is called pain.' And he ends with a dis-

cussion of the passions which reduces will to desire and conceives each emotion from a narrowly individualistic standpoint. "To endeavour" he says, "is appetite"; and, in the race of life, "continually to out-go the next before is felicity."

The foundation of the political system of Hobbes is the teaching that men "are by nature equal," and self-seeking; that "many men at the same time have an appetite to the same thing; which yet very often they can neither enjoy in common, nor yet divide"; that consequently "every man is enemy to every other" and that "during the time men live without a common power to keep them all in awe, they seek such a Common Power, as may be able to defend them from invasion of foreigners and are in that condition which is called War." "The only way," Hobbes continues, "to erect such a Common Power, as may be able to defend them from invasion of Foreigners and the injuries of one another * * * is to confer all their power and strength upon one man or upon one Assembly of men, that may reduce all their Wills, by plurality of voices, unto one Will." Hobbes accordingly conceives of a government as formed by a mutual contract of individuals, of whom each seeks simply his own preservation, happiness, and security. The contract, he insists, is between each individual "subject" and every other—not at all, between subject and sovereign. It is made, he says, "by covenant of every man with every man * * * as if every man should say, *I authorise and give up my Right of Governing myself to this Man, or to this Assembly of men, on this condition, that thou give up thy Right to him.*" Upon this theory, that the covenant of every citizen with every other underlies government, Hobbes bases his well-known doctrine of the absolute right of the sovereign. For, he argues, all the governed "are bound, every man to every man to Own and be reputed Author of all, that he that already is their Sovereign, shall do, and judge fit to be done." In other words "every Subject is Author of every Act the Sovereign doth."

Hobbes asserts unambiguously the subordination of church to state. "The Kingdom of Christ," he declares, "is not of this world; therefore neither can his ministers (unless they be Kings) require obedience in His name." It follows, he teaches, "that every Christian Sovereign [is] the supreme Pastor of his own Subjects"; and that every subject is bound to obey the command of his sovereign with regard not only to the forms of religious worship but to the nature of the doctrines openly professed. Such conformity to the will of even an "infidel sovereign" does not conflict, Hobbes insists, with our duty to God. For God requires of us only faith and obedience to his laws. "And when the Civil Sovereign is an Infidel, every one of his own Subjects that resisteth him sinneth against the Laws of God (for such are the Laws of Nature) and rejecteth the counsel of the Apostles that admonisheth all Christians to obey their Princes.

* * * And for their *Faith* it is internal and invisible; they have the license that *Naaman* had, and need not put themselves into danger for it. But if they do, they ought to expect their reward in Heaven, and not complain of their

Lawful Sovereign; much less make war upon him."

It is not possible, within the limits of this article, to outline the ingenious argument by which Hobbes seeks to toist upon a present generation, the responsibilities of a social contract which a past generation made. Still less is it possible to present an adequate criticism of the conception of Hobbes. Psychologists and sociologists have long since agreed that his psychology and his political theory are alike defective; that societies and governments grow, and are not manufactured; and that sympathy no less than selfishness is a basal instinct. Yet Hobbes's theory of society is still worth studying, not only because it is expressed in such vigorous English, nor even mainly because of the influence it exerted on Rousseau and Spinoza (qq.v.), but primarily because it so ruthlessly depicts society as it would be if men were no more than self-seeking and egoistic.

It is evident that the brilliant attempt of Hobbes to justify the absolute supremacy of the monarch could find little favor in England in the years of the Parliamentary struggle with Charles I. Hobbes, who was morbidly timid, believed that he stood in personal danger and betook himself, a voluntary exile, to Paris where he spent 11 years in the society, on the one hand, of French men of science and letters, and on the other hand, of the English royalists. In 1646 Hobbes became the tutor of the young prince, later Charles II. He published in the meantime an epitome in Latin, 'De Cive,' of his doctrine of government, and afterward the earlier work already referred to. In 1651 he brought out the work by which he is best known, 'Leviathan, Or, The Matter, Form and Power, of a Commonwealth.' This book is the most popular, forcible, and detailed discussion of the political theory of Hobbes. It is prefixed by several chapters which are properly psychological, and which embody an egoistic and sensationalistic psychology full of acute introspection and of keen discrimination. The later chapters of 'Leviathan' include suggestions of materialistic doctrine. In spite of its monarchical tendency, 'Leviathan' was violently opposed by the influential clerical party among the English royalists in Paris. Hobbes concluded that he would be safer even in Puritan England, returned accordingly, and lived unmolested under the Cromwells. At the Restoration, in 1666, he regained the royal favor and he never afterward lost the protection of his old pupil, Charles II.

The metaphysical doctrine of Hobbes is expounded in two books published a few years after his return to England: 'De Corpore,' which appeared in 1655, and a translation, 'Concerning Body,' published a year later. This teaching is succinctly stated in these words: "The world (I mean * * * the whole mass of things that are), is corporeal, that is body; * * * and that which is not body is no part of the universe." The doctrine of Hobbes is, in other words, frankly materialistic; he teaches that the innumerable realities which go to make up the universe are, one and all, non-spiritual, or material. So-called spirits are, he holds, merely subtle and intangible bodies; and even God, the First Cause of the universe, is

body. The philosophy of Hobbes becomes in its detail a system of mechanics or of physics; for, since all reality is physical, laws of space or of motion must be ultimate laws.

The metaphysical doctrine of Hobbes deserves more attention than it often receives, because it is so thoroughgoing and internally consistent a system of materialism. The arguments, implicit rather than explicit, on which Hobbes bases it are none the less, in the view of the writer of this notice, unsound. In brief, Hobbes argues for materialism partly because of the untrustworthiness of consciousness, and partly on the ground that physical motions are admitted to be cause of consciousness. "It is evident," he says, while describing the phenomenon of vision, in the second chapter of 'Human Nature,' "that from all lucid * bodies, there is a motion produced to the eye, and through the eye to the optic nerve, and so into the brain * * * and thus all vision hath its original from * motion." From similar observations he concludes that ideas (or in his own words, apparitions or phantasms) "are nothing really but motion * ." The reasoning that consciousness because conditioned by motion is, therefore, identical with motion is evidently illicit; and it is observable that Hobbes, when he tries to define body, motion, and space, really conceives them in terms of ideal reality.

Just before the appearance of the metaphysical works, in 1654, an essay 'Of Liberty and Necessity,' written by Hobbes eight years before in the course of a private discussion with Bishop Bramhall, was published without the knowledge and consent of the author. It was followed in 1656 by a longer and more polemical work, 'The Questions Concerning Liberty, Necessity, and Chance, clearly Stated and Debated between Dr. Bramhall * * and Thomas Hobbes.' The unambiguous teaching of these works is a determinism grounded in psychology, the doctrine "that voluntary actions have all of them necessary causes and are therefore necessitated."

Most of the works which Hobbes published from this time onward are, indeed, controversial in character. Most bitter of them are the books and essays on mathematical subjects, maintaining against Wallis and Ward, Savilian professors in Oxford, the possibility of squaring the circle. The titles of two of these works are an indication of the spirit in which Hobbes wrote them: 'Six Lessons to the Professors of the Mathematics * * * in the chairs set up by * * * Sir Henry Savile in the University of Oxford'; and 'Trypan or Marks of the Absurd Geometry, Rural Language, Scottish Church Politics and Barbarisms of John Wallis.' Hobbes, who was, after all, no trained mathematician, was always worsted in these mathematical contests, but never acknowledged himself defeated.

More serious than the justified criticisms of Ward and Wallis on the mathematics of Hobbes were the attacks upon the orthodoxy and the morality of his teaching. These attacks, and especially the abortive attempt to suppress 'Leviathan' by act of Parliament, caused Hobbes great uneasiness. In the Appendix which he added to his translation of 'Leviathan' into Latin (published 1668) he argued that the teach-

ing of 'Leviathan' is not heretical, and that there remains no English court of heresy; and he wrote at the same time a very vigorous 'Answer to a Book Published by Dr. Bramhall * * * called Catching of the Leviathan,' a book in which the Bishop of Derry had maintained "that the Hobbian principles are destructive to Christianity and to all religion." Nobody doubts today that these charges are unfounded. Hobbes, it is true, inculcated a materialistic philosophy and an egoistic and necessitarian ethics; but upon these doctrines he himself based both the philosophical conclusion that God exists, and an ethical system which exhorts to justice and social virtues, even while it derives these virtues from purely selfish instincts. It is necessary to suppose that many of the men who decried Hobbes had never read him; and that the epithets 'free-liver,' and 'atheist,' which writers of his own and the following century heaped upon him were due, in part at least, to the fact that Hobbes remained throughout his life in some sense under the protection of his former pupil, Charles II. Very unjustly, therefore, he was held responsible for the lax morals of the court. It should be added that from this time onward Hobbes failed to gain from the censor license to publish any work on a political or on an ethical subject. The chief of the works, written at this period but published after the death of Hobbes, is 'Behemoth: The History of the Causes of the Civil Wars of England * * * from the Year 1640 to the year 1660.'

Hobbes spent the last four years of his life with the family he had so long served, that of the Earl of Devonshire. In these later years he returned to the classical studies of his youth, publishing when he was 87 years old, 'The Iliads and Odyssees of Homer, translated out of Greek into English, with a large preface concerning the Virtues of an Heroic Poem.' In his very last year he wrote a sketch, in Latin metre, of his own life. He had feared many things, and death most of all, but he died quietly after a short illness, in 1679.

Bibliography.—The authoritative edition of Hobbes is that of Sir William Molesworth: 'English Works' (in eleven volumes); 'Opera Latina' (in five volumes)—London, 1839-1845. A recent reprint of the 'Leviathan' is that of Thornton (Oxford, 1881). Selections, mainly from the ethical and political writings, are those of E. H. Sneath (1898), and F. J. E. Woodbridge (1903). 'The Metaphysical System of Hobbes' edited by M. W. Calkins (Chicago 1905) contains the important chapters of 'Concerning Body.' For biography and criticism the reader is referred to G. C. Robertson, 'Hobbes' (1886); Leslie Stephen, 'Hobbes' (1884); and Törnien, 'Hobbes, Leben und Lehre' (1896). For complete list of the writings of Hobbes and for further references to his critics, one should consult the works just cited, and the Bibliography of Benjamin Rand, published as Vol. III., Pt. I. of Baldwin's 'Dictionary of Philosophy and Psychology.'

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Hobble-Bush, a viburnum (*V. alnifolium*) of the southern interior of the United States,
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whose branches often stretch along the ground and root at the other end, tripping up the unwary; hence it has such other names as war-faring-tree, tanglefoot, and devil's-shoestrings. The branches are long, flexuous, and reddish in color, and the leaves are nearly orbicular and turn to a deep red in the autumn. See VIBURNUM.

Hobkirk's (hōb'kerks) Hill, Battle of, in the Revolution, 25 April 1781. After Guilford Court-house (q.v.), Greene marched toward the British position at Camden under Rawdon, and encamped at Hobkirk's Hill, about 1½ miles north. He had 940 men in line, prudently encamping in order of battle; and some militia just arrived who took no part in the battle. His trains and artillery had not come up, and a renegade drummer boy informing Rawdon of this, the latter took 960 men, and making a detour to the right through the woods in front of Greene, drove in Greene's pickets with so sudden an onslaught that the Americans had barely time to form. Greene ordered the First Maryland to charge bayonets and William Washington to take the British in the rear with his cavalry, while Ford and Campbell executed flanking movements on Rawdon's wings. But Ford was killed, one of the First Maryland's captains was shot, the men fell into disorder, and Col. Gunby ordered the regiment to form on the rear companies instead of moving the latter forward; the retiring men were seized with a panic, the famous veterans broke, and though soon re-formed, the position was dangerous and Greene had to retreat. Gunby was court-martialed, but acquitted of anything but grave misjudgment. Greene's loss was 135, besides missing militia; Rawdon's 220 (his own figure) or 258 (Tarleton's). Consult Dawson, 'Battles of the United States' (New York 1858); Carrington, 'Battles of the American Revolution' (New York 1877).

Hoboken, hō'bō-kēn, N. J., city in Hudson County; on the Hudson River. It is the terminus of the Delaware, L. & W. R.R. It is opposite New York city, north of and adjoining Jersey City, and has on the north and west the Palisades. Its area is about one square mile. It has electric railway connections with a number of the cities and towns of the State, and by direct ferries with the business district of New York. The principal streets run north and south, nearly parallel with the river. Its long waterfront gives it excellent shipping facilities; and here are located the docks of the ocean steamship lines; the North German Lloyd, the Thingvalla, the Netherlands-American, and the Hamburg-American. The land upon which Hoboken is located as well as much of that adjoining, once formed a part of the territory of New Netherlands. It was early known as Hobocan Hacking, which means "the land of the tobacco-pipe." The tobacco-pipes which were made by the Indians from the stone found in the vicinity gave rise to the name. In 1630 Michael Pauw, of Holland, purchased from the New Netherlands Company a tract of land a part of which is the site of the present city of Hoboken. The land around was soon cultivated and as New Amsterdam grew in numbers and importance, the gardens across the river became

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more valuable. John Stevens (q.v.), in 1804, purchased the land upon which the city now stands, and began the town. At this time and for some years after the Elysian Fields of Hoboken were much used as pleasure grounds by New Yorkers. At first Hoboken was a part of the town of North Bergen, but on 28 March 1855 it was incorporated as a city. The disastrous fire at the wharves of the North German Lloyd Steamship Company, which occurred in 1900, destroyed considerable of the city property and three steamers. The estimated number of lives lost was 200. The chief manufactures of Hoboken are iron products, leather, silk, lead-pencils, caskets, wall-paper, beer, ship-building and repairing, and chemicals. It has extensive coal yards, and large lumber and brick yards. The drainage of the lowlands is now (1903) under consideration, and by this means a large tract of land will be reclaimed and the sanitary conditions of the city improved. The city is the seat of the Stevens Institute of Technology (q.v.), and of the Sacred Heart Academy. It has Saint Mary's hospital, public and parish schools, and several fine church buildings. The government is vested in a mayor, who holds office two years, and a city council. The mayor appoints the school, library, fire, and health commissioners, also the assessors. The police commissioners are appointed by the mayor and approved by the council. The council elects the inspectors, the city clerk and his assistants. Pop. (1890) 43,648; (1900) 59,364; (1910) 70,324.

Hobson, John Atkinson, English social economist: b. Derby, England, 6 July 1858. He was graduated at Oxford University, and from 1887 to 1897 taught English literature and economics for the University Extension Delegacy, and the London Society for the Extension of University teaching. He is one of the foremost of economic writers in England and, as a socialist, advocates the monopolistic control of industries by government, whether municipal, or national. Among his works are 'The Physiology of Industry: Being an Exposure of Certain Fallacies in Existing Theories of Economics' (with A. F. Mummery, 1889); 'The Evolution of Modern Capitalism' (1894); 'The Social Problem: Life and Work' (1901); and 'Imperialism' (1902).

Hobson, Richmond Pearson, American naval constructor: b. Greensboro, Ala., 17 Aug. 1870. He was graduated at Annapolis Naval Academy in 1889 and took a post-graduate course at the Ecole Nationale Supérieure des Mines, and the Ecole d'Application du Génie Maritime in Paris. During the war with Spain he was present at the bombardment of Matanzas and distinguished himself by his heroism in sinking a collier across the entrance to Santiago Harbor, on the night of 3 July 1898, for the purpose of preventing the exit of Cervera's fleet. He resigned from the navy in 1903.

Hobson's Choice, a proverbial expression, denoting "without an alternative." It is said to have had its origin in the practice of Hobson, a carrier at Cambridge, England, in Milton's time, who let horses to the students, and obliged his customers to take the horses in rotation, that they might be worked equally. Milton wrote two epitaphs upon him.

Hoche, Lazare, lä-zär ôsh, French soldier: b. Montreuil 25 June 1768; d. Wetzlar 19 Sept. 1797. He took service in the French guards when 16 years old, and at the revolution joined the popular party. He greatly distinguished himself at the siege of Thionville and the defence of Dunkirk, and shortly afterwards, when scarcely 25 years of age, received the command of the army on the Moselle. In 1793 he drove the Austrians out of Alsace, and soon after was arrested by the Jacobins and imprisoned at Paris. In 1794 he was released, and appointed commander of the army destined to quell the rising in the west, and afterwards to that in La Vendée. In 1796 he conceived the plan of attacking Britain, and making a descent on Ireland, but expired suddenly while in camp with his army of invasion.

Hockey, a game of ball known as hurley in Ireland and shinty in Scotland, dating in its present form from about 1883, when a definite code of rules was drawn up by the Wimbledon Club. According to standard rules the game is played between two teams of 11 players each, on a ground 100 yards long by 50 to 60 yards wide. A goal is erected at each end of the field, and consists of two uprights 12 feet apart supporting a horizontal bar 7 feet from the ground. In front of each goal a line 12 feet long is drawn parallel to the goal-line and 15 yards from it; and from each end of this line, with the corresponding goal-post as centre, a segment of a circle is drawn outwards to meet the goal-line. Thus, a kind of semicircle flattened at the top is drawn in front of each goal, and no goal is scored unless the ball is hit from within this line or striking-circle. The ball used is an ordinary cricket ball painted white; and each player is provided with a stick, curved at the end, without any metal fittings, and not too thick to be passed through a ring two inches in diameter. The players are arranged on the field as in Association football, namely, goal-keeper, two backs, three half-backs, five forwards. The game is started by one player of each side bullying the ball in the centre of the ground, that is, by first striking the ground with his stick and then striking his opponent's stick three times, after which either may strike the ball. When the ball is driven between the goal-posts under the bar by a stroke from within the striking-circle, a goal is scored, and the game is won by the side with a majority of goals scored. The ball may be caught or stopped with any part of the body, but it must not be carried, kicked, or knocked on except with the stick; it must be played from right to left only. The goal-keeper is allowed to kick the ball away in defending his goal. Ends are changed at half-time.

Hock'ing, Joseph, English nonconformist clergyman and novelist: b. St. Stephens, Cornwall, 1859. He was educated at Owens College, Manchester, and entered the nonconformist ministry in 1884. Among his many published books are: 'Story of Andrew Fairfax' (1903); 'The Scarlet Woman' (1899); 'The Purple Robe' (1900); 'The Madness of David Baring' (1900); 'Greater Love' (1901); 'Lest We Forget' (1901). He is a brother of S. K. Hocking (q.v.).

Hocking, Silas Kitto, English Methodist clergyman and novelist: b. St. Stephen's, Corn-

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wall, 24 March 1850. He was ordained a minister in the Methodist Free Church in 1870, and after holding pastorates in Liverpool, Manchester, and elsewhere, resigned from the ministry in 1896. He is a prolific writer and several of his books have been much read in America. Among them may be named 'Alec Green' (1878); 'For Light and Liberty' (1890); 'One in Charity' (1893); 'A Son of Reuben' (1894); 'God's Outcast' (1898); 'The Awakening of Anthony Weir' (1901) 'Gripped' (1902).

Hocking River, a stream which has its rise in Fairfield County, Ohio, and flows south-east into the Ohio River. The whole length is about 80 miles; it is navigable for about 70 miles. Along the shore, in the upper part of the course, is the Hocking Canal.

Hocking Valley Railway Company, The. The Mineral Railroad Company was incorporated 14th April 1864, to build a railroad from Columbus to Athens, Ohio, but beyond making preliminary surveys and securing some rights of way, nothing was done toward the construction of the line. Mr. M. M. Greene, who was operating salt works at Salina (now Beaumont), Ohio, in the Hocking Valley, seven miles north of Athens, in 1867, took up the project, and on 26 June of that year, by decree of the Franklin County Common Pleas Court, the name was changed from Mineral Railroad Company to Columbus & Hocking Valley Railroad Company. In 1868 the line was opened for traffic from Columbus to Lancaster, and in 1869 was completed as far as Nelsonville, where it reached the coal field.

Construction was finished 25 July 1870, to Athens with a branch from Logan to Straitsville, in the coal district. The annual report of the president for the year 1870 stated: "That the company owned 12 locomotives, eight passenger cars, three baggage cars, 279 coal, 60 box, and 26 flat cars, in addition to which, private parties furnished 403 coal cars, and that with all this equipment, together with 150 other cars furnished by connecting lines, the company was unable to supply the demand for coal and would have to provide more coal cars." The gross earnings of the line for 1870 amounted to \$372,229.

In the year 1871, the gross earnings increased to \$548,942 and the president's report for that year stated that a valuable trade for coal had been commenced through Cleveland to points on the Lakes. The report further stated that the heavy traffic made it necessary to renew some of the rails, and that, in order to have a test between iron and steel, 50 tons of steel rails were purchased as an experiment and laid in sidings in Columbus yard under the heaviest wear of any part of the road.

The coal business of the line developed rapidly, the gross earnings for the year 1872 being \$854,892. The company trebled its number of coal cars and began to feel the need of proper outlets for traffic to points beyond Columbus, connecting lines being either unable or unwilling to furnish cars for the business offered their lines. It was thereupon determined to undertake the construction of a line to supply the great demand of the Lakes and the Northwest for Hocking Valley coal, and Toledo was selected as the most appropriate port. Accord-

ingly on 28 May 1872, the Columbus & Toledo Railroad Company was incorporated by M. M. Greene, P. W. Huntington, B. E. Smith, W. G. Deshler, James A. Wilcox, and John L. Gill, and a preliminary survey was at once made.

The line was permanently located from Columbus to Toledo on 15 Oct. 1873. The financial panic of 1874, however, made it necessary to defer for nearly a year the construction, which was commenced 17 Aug. 1875; on 15 Oct. 1876, the line from Columbus to Marion was opened for traffic, and on 10 Jan. 1877, the first regular train ran through to Toledo, where the company had acquired valuable frontage on the Maumee river for the construction of docks.

The Columbus & Hocking Valley and Columbus & Toledo Railroad companies entered into a contract 22 Feb. 1877, providing for the joint management of the two lines and for the joint use of terminal property and facilities in Columbus.

During the year 1877, extensive docks were constructed at Toledo, and connecting lines at Toledo furnished an outlet to points in Michigan and Canada. In the meantime, the Columbus & Hocking Valley Railroad had continued to prosper. In 1877, the Monday Creek and Snow Fork branches in the coal field were partially constructed and opened and seven iron furnaces were in blast in the coal region.

The Ohio & West Virginia Railway was incorporated 21 May 1878, to build from Logan, in the Hocking Valley, to Gallipolis, on the Ohio river, and some little grading was done upon this line, but no further progress was made until one year later, 21 May 1879, when Hocking Valley interests took up the project, amended the charter to extend from Gallipolis to Pomeroy, and commenced construction. The line was opened for traffic 15 Oct. 1880, from Logan to Gallipolis, and 1 Jan. 1881, to Pomeroy.

The Columbus & Hocking Valley, and Columbus & Toledo Railroad companies, and The Ohio & West Virginia Railway Company were consolidated 20 Aug. 1881, under the name of the Columbus, Hocking Valley & Toledo Railway Company.

In 1895, the Wellston & Jackson Belt Railway was built by the Hocking Valley Company from McArthur Junction to Jackson, through the Jackson County coal field, affording a valuable feeder to the line, and was opened for traffic to Wellston 1 Dec. 1895, and to Jackson 10 Feb. 1896.

During the past few years, radical improvements have been made in the capacity of the line for handling traffic; 40 ton coal cars to the number of nearly 6,000 have been added to the equipment, mogul freight engines have been superseded by consolidation engines of greater capacity, making a large increase in the loading of freight trains; improved machinery for handling coal and iron ore has been placed on the company's docks at Toledo, and the yards, sidings, and station facilities of the line have been increased to take care of the constantly growing traffic.

Of the five seams of bituminous coal mined in the State of Ohio, four are to be found on the line of the Hocking Valley Railway, and through its connection with the Kanawha & Michigan Railway at Athens it also receives shipments of coal and coke from the Kanawha

& New River districts of West Virginia. Through its control of dock facilities at various points on the Great Lakes it has been enabled to transport coal for shipment by lake to the amount of nearly 2,000,000 tons during the navigation season of the year 1904.

The Hocking Valley is the longest line of railway entirely within the limits of the State of Ohio, and occupies a central position from the Ohio river to Lake Erie, passing through the capital, with branches in the populous regions of the coal fields. In 1910 the total mileage of the Hocking Valley Railway was 350, made up as follows: Toledo to Pomeroy, 256.8 miles; Athens branch, 26.9 miles; Jackson branch, 17.3 miles; other branches, 43.7 miles. For the year ending 30 June 1910, the gross earnings were \$7,569,330. The operating expenses were \$4,654,281, thus showing net earnings of \$2,915,049, which with other income of \$1,090,988 shows the total net income of the company for that year, \$4,006,037.

F. B. SHELDON,
Assistant to President.

Hodder, Alfred, American author: b. Celina, Ohio, 18 Sept. 1886; d. New York 3 March 1907. In 1886-9 he read law in the office of Senator Teller, in 1889 was admitted to the bar at Denver, Colo., studied in the Harvard graduate school in 1890-1, and was Morgan fellow there 1891-2. He was for a time lecturer in English literature and drama at Bryn Mawr College, contributed extensively to the New York 'Nation,' and published 'The Powers that Prey' (with Josiah Flynt, 1900), a collection of stories of the criminal classes, and 'The Specious Present' (1901), a metaphysical treatise.

Hodge, Archibald Alexander, American Presbyterian divine: b. Princeton, N. J., 18 July 1823; d. Princeton 11 Nov. 1886. He was the son of Charles Hodge (q.v.) and was graduated at Princeton College 1841, where he became assistant professor. In 1847 after graduation in the Theological Seminary of the same place he went to Allahabad, India, as a missionary. He stayed in Asia for three years and returning home held pastoral charges in Maryland, Virginia, and Pennsylvania until 1877, when he became his father's assistant at Princeton Seminary, succeeding in 1878 to the chair of didactic and exegetical theology made vacant by his father's death. Among his works the most important are 'Outlines of Theology' (1879); 'The Atonement' (1886).

Hodge, Charles, American Presbyterian theologian: b. Philadelphia 28 Dec. 1797; d. Princeton, N. J., 19 June 1878. He was educated in Princeton College, graduating in 1815. In 1816-19 he studied in the theological seminary at Princeton, in 1820 was appointed instructor there, and two years later made professor of Oriental and biblical literature. In 1840 he was transferred to the chair of didactic and exegetical theology in the seminary, and 12 years afterwards appointed to the additional chair of polemical theology. In 1825 he founded the 'Biblical Repertory,' afterwards was renamed 'Biblical Repertory and Princeton Review,' and merged in 1872 in the 'Presbyterian Quarterly and American Theological Review.' From the foundation till 1872 he was editor of and chief contributor to the 'Review,'

and two of his works, 'Princeton Theological Essays' (1846-7); and 'Essays and Reviews' (1857), were compiled from his numerous articles in that periodical. Other works are: 'Commentary on the Epistle to the Romans' (1855; enlarged, 1866); 'Constitutional History of the Presbyterian Church in the United States' (1840-41); 'The Way of Life' (1842); 'Systematic Theology' (1871-2), a comprehensive treatise giving an exposition of Calvinistic theology; and 'What is Darwinism?' (1874).

Hodge, Frederick Webb, American ethnologist: b. Plymouth, England, 28 Oct. 1864. He was brought to this country at the age of seven years, and was educated at Washington, D. C. In 1884 he received appointment to the United States Geological Survey, in 1886 became secretary of the Southern Archaeological Expedition, and in 1889, was appointed to the Bureau of Ethnology, Smithsonian Institution. He has written various papers on the Indians of the southwest.

Hodge, John Aspinwall, American Presbyterian theologian: b. Philadelphia, Pa., 12 Aug. 1831; d. 1901. He graduated from the University of Pennsylvania (1851) and from Princeton Theological Seminary (1856). After 35 years of pastoral work he was appointed in 1893 professor of biblical instruction and church polity in Lincoln University. Among his works are 'What is Presbyterian Law?' (1882); 'Theology of the Shorter Catechism' (1888); 'The Ruling Elder at Work' (1897).

Hodges, George, American Episcopal clergyman: b. Rome, N. Y., 6 Oct. 1856. He was graduated from Hamilton College, Clinton, N. Y., in 1877, and from the Berkeley Divinity School, Middletown, Conn., in 1881. He was assistant rector of Calvary Church, Pittsburg, Pa., 1881-9, and rector 1889-94, in the year last named becoming dean of the Episcopal Theological School in Cambridge, Mass. He has published among other works: 'Christianity Between Sundays' (1892); 'The Heresy of Cain' (1894); 'In the Present World' (1896); 'Faith and Social Service' (1896); 'The Battles of Peace' (1897); 'The Path of Life' (1897); 'William Penn' (1900). He is one of the most prominent members of the Low Broad Church School in the Episcopal Church.

Hodgetts, höj'ets, Edward Arthur Brayley, English journalist: b. Berlin, Germany, 12 June 1859. He has been connected with several influential London journals in the capacity of correspondent and was foreign editor of the New York *World* in 1894. Among his published books are 'Liquid Fuel' (1890); 'Round About Armenia' (1896); 'A Russian Wild Flower' (1897); and a translation of 'The Swiss Family Robinson' (1897).

Hodgkin, höj'kin, Thomas, English historian and banker: b. Tottenham, Middlesex, 29 July 1831. He has been for many years the senior partner in a banking firm at Newcastle-on-Tyne, but since 1874 has given his time to historical writing. He has published 'Italy and her Invaders,' a work of much importance, of which eight volumes have already appeared (1880-90); 'Dynasty of Theodosius' (1889); 'Life of George Fox' (1896); 'Life of Charles the Great' (1897); etc.

HODGKIN'S DISEASE — HOFFMAN

Hodgkin's Disease. See PSEUDOLEUCÆMIA.

Hodgkinson, hōj'kín-són, **Eaton,** English engineer: b. Anderton, Cheshire, 1789; d. 1861. After a somewhat desultory education, and the pursuit of independent investigations in mechanics he was appointed in 1847 professor of the mechanical principles of engineering at University College, London. He was one of the royal commission appointed in 1847 to inquire into the application of iron in railroad building. His principal experiments led him to the determination of the "neutral line" in the section of fracture, an important step in the progress of engineering science. Among his many writings is 'Researches on the Strength and Other Properties of Cast Iron' (1846).

Hodgson, hōj'són, **Shadworth Hollway,** English metaphysician: b. Boston, Lincolnshire, 25 Dec. 1832. He was educated at Rugby and Oxford and is the author of 'Time and Space' (1865); 'Principles of Reform in the Suffrage' (1866); 'The Theory of Practice' (1870); 'The Philosophy of Reflection' (1878); 'The Metaphysic of Experience' (1898); etc.

Hodograph, hōd'ō-gráf, the term for a velocity diagram which facilitates the study of kinematics. It signifies the curve along which the extremities of lines drawn from a fixed point pass and exhibit in direction and magnitude the velocities of a moving object at the different points of its orbit or path.

Hoe, Richard Marsh, American inventor: b. New York 12 Sept. 1812; d. Florence, Italy, 7 June 1886. He was the son of Robert Hoe (q.v.). In 1846 with his brother Peter S. he perfected a rotary printing-press which was called "Hoe's lightning press." Subsequently the two brothers invented the Hoe web-perfecting press. These were especially adapted to newspaper printing and made a revolution in that art. The sons of Richard M. Hoe and of Peter S. Hoe conducted the business after the death of the brothers, and added various improvements to the original Hoe printing-press. The factory in New York in 1903 was said to be the largest printing-press works in the world.

Hoe, Robert, American inventor: b. Leicestershire, England, 1784; d. 1833. He came to the United States in 1803, was for a time a joiner, and later entered partnership with his brothers-in-law, Matthew and Peter Smith, for the sale of a hand printing-press, the invention of the latter. He took over the business in 1823. The original Hoe printing-press was designed and built by him.

Hoe, Robert, American manufacturer: b. 1839. He is a nephew of Richard M. Hoe (q.v.). He became the head of the Hoe firm, and maintained its high position among establishments of its class. A founder of the Grolier Club of New York, he was also its first president. He published an edition (1880) of Maberley's 'Print Collector.'

Hoe'ber, Arthur, American artist: b. New York 23 July 1854. He studied under Beckwith in New York and under Gérôme at the Ecole des Beaux Arts, exhibited for the first time at the Salon in 1882, and is a contributor to most American exhibitions. He is art critic to the *Commercial Advertiser*. Among his writings are 'Treasures of the Metropolitan Museum of

Art'; and 'Painting in the 19th Century in France, Belgium, Spain and Italy.'

Hoey, Frances Sarah Johnston, Irish novelist: b. near Dublin 1830. She was married to A. M. Stewart in 1846, and to John Cashel Hoey in 1858. Among her books, which have circulated in America as well as in England, are: 'A House of Cards'; 'A Golden Sorrow'; 'No Sign'; 'A Stern Chase'; 'His Match and More.'

Hofer, hō'fēr, Andreas, Tyrolese patriot: b. Sankt Leonhard 22 Nov. 1767; d. Mantua 20 Feb. 1810. He was landlord of the inn "Am Sand" at Sankt Leonhard, and hence often known as "Sandwirt." In 1796 he led a rifle company against the French on Lake Garda, and after the Peace of Lunéville was prominent in the organization of the Tyrol militia. In 1809 he led in an insurrection of the Tyrolese for shaking off the yoke of Bavaria, to which their country had been transferred by the Treaty of Presburg. In a short time, with intermittent assistance from the Austrians, he defeated the French and Bavarian troops, and nearly the whole country was liberated. Hofer then carried on the military and civil administration, till the Peace of Vienna was proclaimed. Misled by false reports he commenced hostilities anew, and thus forfeited the protection of the amnesty. He remained concealed for some time, but was at last betrayed to the French, and carried to Mantua, where he was tried by a court-martial and shot. His family was indemnified for the loss of their property by the Emperor of Austria in 1819, and his son ennobled. The career of Hofer furnished material for tragedies by Immermann and Auerbach. Consult the studies by Heigel (1874) and Stampfer (1891).

Hoff, hōf, William Bainbridge, American naval officer: b. Philadelphia, 1846; d. Washington, D. C., 23 May 1903. He entered the naval service in 1860, and in 1863 was graduated from the Naval Academy. He took part in several naval campaigns during the Civil War, and at the torpedo school and on the United States steamship Dale he gave his attention to the instruction of seamen in gunnery. In 1893 he was marine commissioner to Great Britain for the World's Fair at Chicago, and was retired in 1897. He was the author of 'Elementary Naval Tactics'; and 'Avoidance of Collisions at Sea.'

Hoffman, hōf'man, Charles Fenno, American poet and novelist: b. New York 1806; d. Harrisburg, Pa., 7 June 1884. He entered Columbia College, and studied law at Albany, being called to the bar in 1827. In 1830 he became joint-editor of a New York journal, and three years later started the 'Knickerbocker Magazine.' For many years he edited the 'American Monthly Magazine,' also. In 1849 his mind began to give way, and from that time till his death he was an inmate of Harrisburg lunatic asylum. His first separate publication was 'A Winter in the West' (1835), followed in 1837 by 'Wild Scenes in Forest and Prairie,' and in 1840 by the novel 'Greyslaer: a Romance of the Mohawk,' which met with immediate and remarkable success. An earlier novel, 'Vanderlyn,' appeared in the 'American Monthly Magazine' during 1837. Several of his songs have

gained great popularity. His published volumes of verse include: 'The Vigil of Faith' (1842); 'The Echo' (1844); 'Lays of the Hudson, and other Poems' (1846); 'Love's Calendar, and other Poems' (1848).

Hoffman, Eugene Augustus, American Episcopal clergyman: b. New York 21 March 1829; d. near Plattsburg, N. Y., 17 June 1902. He was educated at Rutgers and Harvard colleges and at the General Theological Seminary. He held successive rectorships at Elizabeth, N. J., Burlington, N. J., Brooklyn, N. Y., and Philadelphia, and in 1879 was appointed dean of the General Theological Seminary, New York, and with others of his family, heavily endowed that institution. Dean Hoffman built Christ Church and rectory at Elizabeth, N. J., and also churches at Woodbridge and Milburn, N. J. He was the author of 'Free Churches' (1858); and 'The Eucharistic Week' (1859 and 1893).

Hoffman, Murray, American jurist: b. New York 29 Sept. 1791; d. Flushing, L. I., 7 May 1878. He graduated from Columbia College in 1809; was admitted to the bar, became assistant vice-chancellor of the superior court of New York in 1839, serving till 1843, and was elected judge in 1853, holding that position for eight years. He wrote: 'Office and Duties of Masters in Chancery and Practice in the Master's Office' (1824); 'A Treatise on the Practice in the Court of Chancery,' in three volumes (1834-40); 'Reports of Cases, Court of Chancery' (1839-40); several treatises on Church Law and numerous other works.

Hoffman, Richard, American pianist and composer: b. Manchester, England, 24 May 1831; d. 17 Aug. 1909. He came to New York in his 16th year. He received early instruction from Rubinstein, Liszt, Thalberg, Döbler and Meyer. After his arrival in America he made a tour of the country as a soloist, and later accompanied Jenny Lind on her tours; he also played with Gottschalk and Von Bülow in New York in 1875. Later he became an important figure in American musical life. He composed music for the piano, songs, anthems, ballads and church music.

Hoffman, William M., American inventor: b. Buffalo, N. Y., 1853. He received only a limited education and began to earn his living when nine years of age. He prospered until he was 20, when misfortune overtook him and he became a fireman on the Erie Railroad. The clumsiness in the action of the piston rod which runs to the driving-wheels of an engine, involving such a waste of power, attracted his attention and decided him to build an engine in which there should be no such starting and stopping, but in which the power should create a direct rotary movement. He studied for eight years the technical branches of engineering, and at the end of this period became chief engineer of a large tannery in Buffalo. He there invented a new set of "fleshing" and "putting out" machinery for use in a tannery, and sold the invention to obtain funds with which to experiment on his engine. He went to Detroit in 1886 and organized a company to produce his engines. He spent the first funds in experiments, and built five models, all of which refused to stir when connected up, nor were they in any way operative. In the winter of 1898-9

he went to Buffalo, there producing No. 6, which was a partial success. It was of a type in which the piston revolved in the cylinder, and showed a great advance over his previous models in control and speed and in sustaining varying loads. The internal friction made in this "annular cylinder" type was too great, and he set out to lessen it or do away with it altogether. Hoffman worked day and night, and when exhausted would ride on a trolley car all over the city till his brain became clear again, then would go back to work. It was on one of these rides that he thought out the principle which, with a few perfections, achieved the long-sought end. Hoffman thought that if the piston would not revolve inside the cylinder, the cylinder might revolve around the piston, and he immediately designed an engine in which the cylinder revolved around the eccentric abutment by introducing radial wings extending from the shell toward and against the stationary eccentric core. This engine, though proved by actual test of 18 months to be a success, was such a disappointment to Hoffman that he mortgaged all his property and returned the money which he had borrowed from financiers in August 1902 to further his investigations. Hoffman's son Bertram and Randl Riehl then joined him, and together, in July 1904 they brought out a 28 h.p. engine which was put into operation in the basement of the Ellicott Square Building in Buffalo and which has proved a success. He then made a twelfth and last design in a 300 h.p. compound engine, which is the largest of its type ever built and which, it is claimed, shows an economy of 33 per cent and a saving in floor space of 80 per cent as compared with the highest type of reciprocating engine, while the friction load has been reduced to 1.1 per cent. All of Hoffman's patents have now been merged into one company, of which he is president.

Hoffmann, August Heinrich, ow'goost hin'-rih hōf'mān, usually known as **HOFFMANN VON FALLERSLEBEN**, German poet and philologist: b. Fallersleben, Hanover, 2 April 1798; d. Corvei 19 Jan. 1874. He studied at Göttingen and Bonn, was appointed in 1823 custodian of the university library at Breslau, and in 1830 became extraordinary, in 1835 ordinary professor of the German language and literature in the university of that city. He resigned his librarianship at Breslau in 1838, and in 1842 was removed from his chair without a pension because of the liberal political views represented in his 'Unpolitische Lieder' (1840-1). He led a wandering life till 1845, when he obtained the right of domicile in Mecklenburg. In 1848 he was granted a pension by the Prussian government, and from 1860 he was librarian to the Duke of Ratibor. Of his original writings the best known are his songs, not a few of which, especially that beginning 'Deutschland, Deutschland über Alles' (1841), have long received emphatic popular approval. For several of them he composed tunes. They were published in several volumes, among these being: 'Gedichte' (1827); 'Alemannische Lieder' (1827); 'Hundert Schullieder' (1848); 'Deutsches Volksgesangbuch' (1848); 'Soldatenlieder' (1851); 'Kinderwelt in Liedern,' and 'Alte und Neue Kinderlieder' (1873). A complete edition of his 'Kinderlieder' was prepared by von Donoo in

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1877. 'Mein Leben' (1868; abridged edition continued to his death, by Gerstenberg, 1892-4), is autobiographical. Consult also the 'Life' by Wagner (1869).

Hoffmann, Heinrich, German painter: b. Frankfurt-on-the-Main, 18 Oct. 1814. Beginning life as a room decorator, in 1843, he adopted landscape painting as his profession and studied under Jacob Becker with that end. Long wanderings and careful studies of nature in the Taunus Mountains, in Obenwald, and the Black Forest, as well as in the valleys of the Rhine and Mosel, were followed by extensive travels in Switzerland and the Tyrol. The results of this preparatory training appeared in his first large canvas in which the old romantic spirit was blent with an independent and realistic presentation of nature which at once attracted public attention. He has produced numberless Alpine and forest landscapes, moonlight and street scenes, most of which are in private collections at Frankfurt.

Hofmann, August Wilhelm, von, German chemist: b. Giessen 8 April 1818; d. Berlin 5 May 1892. He studied law, obtained the degree of doctor of philosophy, became assistant under Liebig in the Giessen Laboratory, and in 1845 became professor of chemistry in the University of Bonn. The same year he was appointed superintendent of the new Royal College of Chemistry in London, and in 1853 became professor of chemistry in the Royal School of Mines, though still remaining at the head of the College of Chemistry. In 1861 he was elected president of the London Chemical Society, and in 1863 was appointed to the chair of chemistry in the University of Berlin, where he remained till his death. In 1864 he built a laboratory at Bonn and became its director, and in 1868 founded the German Chemical Society. He was judge of several industrial expositions and was a member of many scientific societies, and for his valuable services was ennobled in 1888. A statue of him is in the National Gallery of Berlin. He wrote: 'A Handbook of Organic Analysis' (1853); 'Introduction to Modern Chemistry' (1865); 'Zur Erinnerung an vorangegangene Freunde' (1889); etc.

Hofmann, Heinrich, German painter: b. Darmstadt 19 March 1824. In his native town he began his studies as a copper-plate engraver, but subsequently under Schadow and Hildebrande turned his attention to painting, to which henceforth he devoted his life. After extensive travels in Europe, which included a residence of four years in Italy, he settled at Dresden as professor of painting in the Academy there. The most famous of his pictures are: 'The Burial of Christ'; 'King Enzo in Prison'; 'The Betrayal of Christ,' in the Darmstadt Gallery; 'The Finding of Christ in the Temple,' in the Dresden Gallery; 'Christ Preaching on the Lake,' in the Berlin National Gallery; 'Venus and Cupid'; 'Romeo and Juliet'; 'Othello and Desdemona'; and 'Christ in Gethsemane.' All the creations of Hofmann testify to his sense of refined beauty and are rather remarkable for harmonious coloring and delicacy than for originality of design or composition, as he clings to the tradition of the classic period in the ideal character of his conceptions. His works are popular and have been engraved and photo-

graphed more extensively perhaps than those of any contemporary German painter of his order.

Hofmann, Josef, yō'sēf, Polish pianist: b. Cracow 20 Jan. 1877. He studied with his father, a professor in the Warsaw Conservatory and director of the Warsaw opera, appeared as a pianist in public at the age of six, became known as one of the most notable of musical prodigies, visited the United States in 1887-8, and was there prevented from playing through the action of the Society for the Prevention of Cruelty to Children. After a period of study, two years of which were spent as a pupil of Rubinstein, he made his début as a virtuoso at Dresden in 1894. His recitals in New York in 1901 showed him to be one of the leading modern pianists. His compositions include some interesting works for the pianoforte.

Hog-feeding. See NUTRITION OF FARM ANIMALS.

Ho'gan, John Joseph, American Roman Catholic bishop: b. Bruff, County Limerick, Ireland, 10 May 1829. He came to St. Louis, Mo., in 1848, studied at the Roman Catholic theological seminary there, was ordained priest in 1852, and built and became pastor of St. Michael's Church of St. Louis. In 1868 he was consecrated bishop of St. Joseph, Mo., and in 1880 was transferred to the see of Kansas City.

Hogarth, hō'gärth, David George, English archæologist: b. Barton-on-Humber, Lincolnshire, 23 May 1862. He was educated at Oxford and has since conducted excavations at Paphos, Alexandria, Fayum and elsewhere in the East. He was director of the British School at Athens 1897-1900 and has published: 'Devia Cypria' (1890); 'Modern and Ancient Roads in Asia Minor' (1892); 'A Wandering Scholar in the Levant' (1896); 'Philip and Alexander of Macedon' (1897); 'The Nearer East' (1902).

Hogarth, William, English painter and engraver: b. London 10 Nov. 1697; d. there 25 Oct. 1764. He studied art at Sir James Thornhill's school, James Street, Covent Garden. About 1720 he set up for himself, and designed plates for booksellers, the chief of which are the illustrations to Gray's edition of 'Hudibras' (1726). He had ample employment for what are called "conversation pieces," that is, groups of family portraits, united by some common occupation or interest, but never cared greatly for this branch of art. In March 1729 he married clandestinely the daughter of Sir James Thornhill, and shortly afterward began to display his extraordinary faculty for depicting the vices and follies of his time. In 1730-1 he painted 'A Harlot's Progress,' a series of six pictures, like many of his other works, engraved by himself. It was published in April 1732. The 'Harlot's Progress' was followed by other satiric delineations, such as 'A Midnight Modern Conversation' (1734), 'Southwark Fair' (1735), 'A Rake's Progress' (1735), 'The Distressed Poet' (1736), 'The Four Times of the Day,' and the 'Strolling Actresses Dressing in a Barn' (1738). With less success he also produced the large canvases still in St. Bartholomew's Hospital—the 'Pool of Bethesda' and the 'Good Samaritan,' both executed in 1736; and also painted several portraits. The series of graphic satires was, however, continued

by the 'Enraged Musician' (1741) and the famous 'Marriage à la Mode' (his masterpiece), six pictures now in the National Gallery, and engraved by various hands in 1745. 'Industry and Idleness,' 12 plates, followed these in 1747; 'Calais Gate' (1749) came next, and in 1750 the fine plate known familiarly as the 'March to Finchley.' The minor plates of 'Beer Street' and 'Gin Lane' and the set called 'The Progress of Cruelty' belong to 1751. In 1752 Hogarth published his 'Analysis of Beauty,' a treatise containing many shrewd remarks, but confused and illiterate in its style, and the cause of much ridicule. After this he produced (with the aid of Grignion and others) the four prints of the 'Election Series' (1755-8), the 'Cockpit' (1759), etc. In 1762-3 he became involved in a miserable quarrel with Wilkes and Churchill, the result of which, on his side, was the well-known portraits of Wilkes, and of Churchill as a bear ('The Bruiser').

Most of Hogarth's pictures, which now enjoy a much higher repute for technique than formerly, are preserved in public or private collections in Britain. He was entirely uninfluenced by foreign art. His powers of invention and combination were extraordinary; and as a humorist and social satirist with the pencil he has never been surpassed. There can be no doubt also that he genuinely desired to assist by his work in the reformation of manners. Consult the biographies by Sala (1866) and Dobson (1879).

Hoge, hōg, Moses Drury, American Presbyterian clergyman: b. Hampden-Sidney, Va., 17 Sept. 1819; d. Richmond, Va., 1899. He was graduated at Hampden-Sidney College and Seminary and was pastor of the Second Presbyterian Church in Richmond, Va. (1845-85). He ran the blockade in a ship from Charleston during the Civil War and secured from England a large number of copies of the Holy Scriptures for distribution among the Confederate soldiers, the British and Foreign Bible Society making a special grant at his request. After the war he was instrumental, especially during the session in 1874 of the Southern Presbyterian Church, in reconciling differences with the Northern Presbyterian Church.

Hogg, James, Scottish poet, familiarly known as "THE ETTRICK SHEPHERD": b. Ettrick, Selkirkshire, 25 Jan. 1770; d. Altrive, on the Yarrow, 21 Nov. 1835. After receiving a very scanty education, he began to earn his bread by daily labor as a shepherd. His early rhymings brought him under the notice of Sir Walter Scott, by whose advice he published a volume of ballads called 'The Mountain Bard.' He then went to Edinburgh, where he published the 'Forest Minstrel' (1810), and started a weekly periodical entitled 'The Spy.' The appearance of the 'Queen's Wake' in 1813, with its charming ballad of Kilmeny, established Hogg's reputation as a poet. In 1815 he published 'Pilgrims of the Sun,' followed by 'Mador of the Moor'; the 'Poetic Mirror' (a collection of imitations of living poets); 'Queen Hynde,' and 'Dramatic Tales,' as well as by 'The Brownie of Bodsbeck,' etc. From 1817 he held the farm of Altrive from the Duke of Buccleuch at a merely nominal rent; but his farming

schemes never throve, and he was generally in narrow circumstances.

Hogg, James Stephens, American politician and lawyer: b. near Rusk, Tex., 24 March 1851; d. Houston, Tex., 3 March 1906. He took up the practice of law, and was justice of the peace in Wood County 1873-5, and county attorney 1878-80. In 1880 he was district attorney in the 7th judicial district of Texas; in 1886 became attorney-general of the State and from 1890 to 1895 was governor. He was one of the Democratic governors who objected to the use of United States troops by President Cleveland at the time of the Pullman strike in 1894. After serving as governor he returned to the practice of law, and remained active in politics, being prominent as a public speaker.

Hog'nose, a North American colubrine serpent (*Heterodon platyrhinus*), so-called because of its upturned pig-like snout. It is usually about two feet long, gray marked with brown bars, but sometimes is so dark that the whole surface appears blackish; and dwells and seeks its prey mainly in the woods and thickets. When alarmed—and it is extremely timid—it hisses violently (whence other rustic names such as "blowing-adder"), and expands and flattens the head and neck by inhaling air and stretching out the ribs, giving itself a most ugly aspect. If these tactics do not succeed in terrifying the enemy sufficiently, the snake begins a series of astonishing contortions and twistings which end in the animal throwing itself upon its back and seeming dead until a chance of escape offers. Two or three other species are known in the South and West, all of which are regarded as poisonous by most country people, but are really quite harmless.

Hogs, or Swine, hoofed quadrupeds of the family *Suidæ*, including several genera and many species and domesticated races. The males are called "boars," the females "sows," the young "pigs," and the flesh "pork." The hogs proper, both wild and tame, belong to the genus *Sus*, represented in the wilderness of the Old World by the wild boar (*S. scrofa*), which is, or was, known throughout southern and central Europe, Algeria, Asia Minor, and southwestern Asia; and by the Indian boar (*S. cristatus*) of India and Indo-China. The wild boar stands from 30 to 40 inches high at the shoulder and will weigh on the average about 250 pounds. His snout is longer, his ears shorter than those of the domestic hog. He roots up the ground in a different manner, ploughing it in furrows; his tusks are larger, some of them being 10 inches in length, bent circularly, and exceedingly sharp at the points. The young wild boar, for the first three years of his life, follows the sow, the whole litter living in a herd together, and although the adults are plain iron gray (the male exceedingly large and shaggy) the young are striped and spotted. Old boars range the forest alone and unsupported, dreading no single creature, not even man himself. Hunting this animal has always been a favorite amusement, and in Europe is usually pursued on foot by the aid of large dogs, the hunters armed with strong pikes termed *boarspears*. A chase seldom terminates without the maiming or destruction of some of the dogs, and tests the courage of the men, for a charge from an enraged or wounded

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boar is a formidable thing. In India the chase is pursued on horseback, the rider using a long spear. Hence the sport is known as "pig-sticking," and it involves much risk and danger, and the death of many horses ripped open by the boar's tusks. In addition to these, a small wild pig inhabits western equatorial Africa; there are two lesser species in India, one not much bigger than a hare; and several in the islands stretching from Sumatra to Japan.

Domestic Races.—Swine everywhere have seemed easily tamable and susceptible to domestication, breeding fertile in confinement and easily adapting themselves to new environments. Since prehistoric times, therefore, the animal has been raised by man in many parts of the world to supply food. The process of domestication seems to have gone farther toward producing a good pork-making animal in the Orient than in Europe until the revival of agriculture there following the decay of the feudal system. In Great Britain there was early introduced eastern blood called Chinese stock, and it is from the union of these two strains—one derived from the European wild boar and the other from some or many Oriental species—that European and American farmyard swine are descended. The foremost breed, in general popularity, is the Berkshire, which originated in the English County of Berks, but is now universal. The Berkshire hog is of large size, yields pork of great fatness and excellent flavor, grows rapidly and is hardy. It is usually black in color. An American breed, developed first in Ohio, and known as Poland-China, is very similar to the Berkshire, and has been perfected until it has become the principal pork-producing hog of the Mississippi Valley. The English white breeds are led by the Yorkshire, which reaches a larger size than any other kind; and from which has been developed an American strain, called Chester Whites, after the county in eastern Pennsylvania where it originated. New Jersey has a local breed called Durocs, or Jersey red hogs, which have the advantage of great hardiness. For these breeds regular stock-registers have long been maintained. Various other well-known strains of swine in Great Britain and America are the Tamworth, Victoria, Essex, etc. The domestic hog has run wild in various parts of the world. In many of the South Sea islands, and in parts of South America, they have practically returned to a feral condition, and are public game. In the southern part of the United States large numbers of pigs, nominally under ownership, range the woods, picking up their own food of herbage, roots and mast; these become gaunt, thin, high-backed, bristly and develop great running powers, cunning (the intelligence of the whole race is comparatively high), and savagery of disposition; they are locally known as "razor backs."

For the proper care and treatment of hogs raised for their pork see NUTRITION OF FARM ANIMALS.

Domestication has changed the form and proportions of the body, the color, etc.; thus the skull is higher and broader in proportion to its length, and it is more upright in the occipital region. The sow brings forth from the 16th to the 20th week after conception, and has usually two litters in a year. Her offspring are very numerous, a litter consisting of from 10 to even

20; but she can bring up no more than she has teats, which are 12 in number. The natural term of the life of these animals is from 15 to 30 years, and they continue to increase in size and strength until they are from four to five years of age. As might be supposed from their habits, they are much infested by vermin of different kinds, and are also liable to many disorders, particularly those arising from gluttony. Notwithstanding repugnant qualities the hog is of incalculable benefit to mankind. Its flesh is pleasant, substantial and nutritious. Pork takes salt better than almost any other meat, and may be cured and preserved in many ways. The fat (lard) is one of the most important culinary articles; the bristles are used in large quantities in the manufacture of brushes, while the skin is in demand among saddlers, trunk-makers, and manufacturers of small articles of leather, calling for great durability with flexibility and a handsome appearance.

The family includes various wild species more or less closely related to the typical swine, such as the babirusa, peccaries, river-hogs, wart-hogs, etc., elsewhere described.

The principal English works on swine are Long's 'The Book of the Pig' (1889), and Spencer's 'Pigs, Breed and Management' (1897). American works of note are Coburn's 'Swine Husbandry' (1889); Harris' 'On the Pig' (1896), and pamphlets issued by the Department of Agriculture. See NUTRITION OF FARM ANIMALS; PORK; PACKING INDUSTRY.

Hogs'head, a liquid measure formerly in use in England. Its capacity varied in different cases. For beer it was 54 gallons, for rum 45 to 50 gallons, for brandy 45 to 60 gallons, and for different kinds of wine it varied from 46 to 93 gallons. In the United States the measure is still in use, being equivalent to 63 American gallons or 52.485 imperial gallons; for tobacco it varies from 750 pounds in some States to 1,200 pounds in others.

Hohenlinden, ho-ën-lin'dën, Germany, a village of Bavaria, 20 miles east of Munich, celebrated for the victory gained by the French under Moreau over the Austrians under the Archduke John, 3 Dec. 1800. The French took nearly 80 pieces of cannon, 200 caissons, and more than 10,000 prisoners, with three general officers.

Hohenlohe-Schillingsfürst, hō-ën-lō'é shil'-lings-fürst, Chlodwig Karl Victor, PRINCE von, German chancellor: b. Rotenburg-an-der-Fulda March 1819; d. Ragatz, Switzerland, 6 July 1901. He took courses in law and political science at Heidelberg, Göttingen and Bonn. He entered public life and became in 1866 prime minister of Bavaria. In 1874 he was German ambassador at France and in 1885 became governor-general of Alsace-Lorraine. In 1894 he was appointed chancellor and resigned in 1900.

Hohenstaufen, hō-ën-stow-fën, **House of**, a German dynasty reigning from 1138 to 1254. After the death of the Emperor Henry V. (1125), his two nephews, Frederick II., duke of Swabia, and Conrad, duke of Franconia, aspired to the German crown; but were opposed by the directors of the election, the Archbishop of Mayence and the papal legate; and Lothaire of Saxony was elected. This circumstance, with the demand made by the new emperor of the

HOHENZOLLERN — HOISTING APPARATUS

restitution of all the possessions acquired by the lords of Hohenstaufen during the preceding reign, produced a fierce war between the emperor and the two brothers. Lothaire preserved himself by a union with Henry the Proud, duke of Bavaria, to whom he gave his daughter and the Duchy of Saxony. The Peace of Mühlhausen (1135), between Lothaire and Conrad, put an end to this Ten Years' war. Conrad renounced his title of King of Italy which he had taken, but received the first rank among the dukes, and both he and his brother regained all their lands. After Lothaire's death (1137) Conrad, duke of Franconia, of the house of Hohenstaufen, was raised to the throne of Germany, with the title of Conrad III.

After the death of Conrad III. (1152) the confidence which was felt in the Hohenstaufen family caused the choice to fall on his nephew, Frederick III. of Swabia, called Barbarossa (the Red-beard), who was followed by Henry VI. (1190), and he again by Otto IV. (1197) and Frederick II. (1215-50), all belonging to the same house. After the death of Frederick II. his son Conrad was acknowledged as his successor, with the title of Conrad IV., by most of the states of the empire; but Innocent IV. laid him under an interdict, and declared him to be deprived of all his lands. The conflict between Conrad and the Pope lasted until the latter's death in 1254. The fame of the house of Hohenstaufen is based upon the political greatness to which the Fredericks in particular attained; their success in reducing to order all the states of the empire; the encouragement which they gave to commerce and trade, and their efforts to promote the sciences and arts.

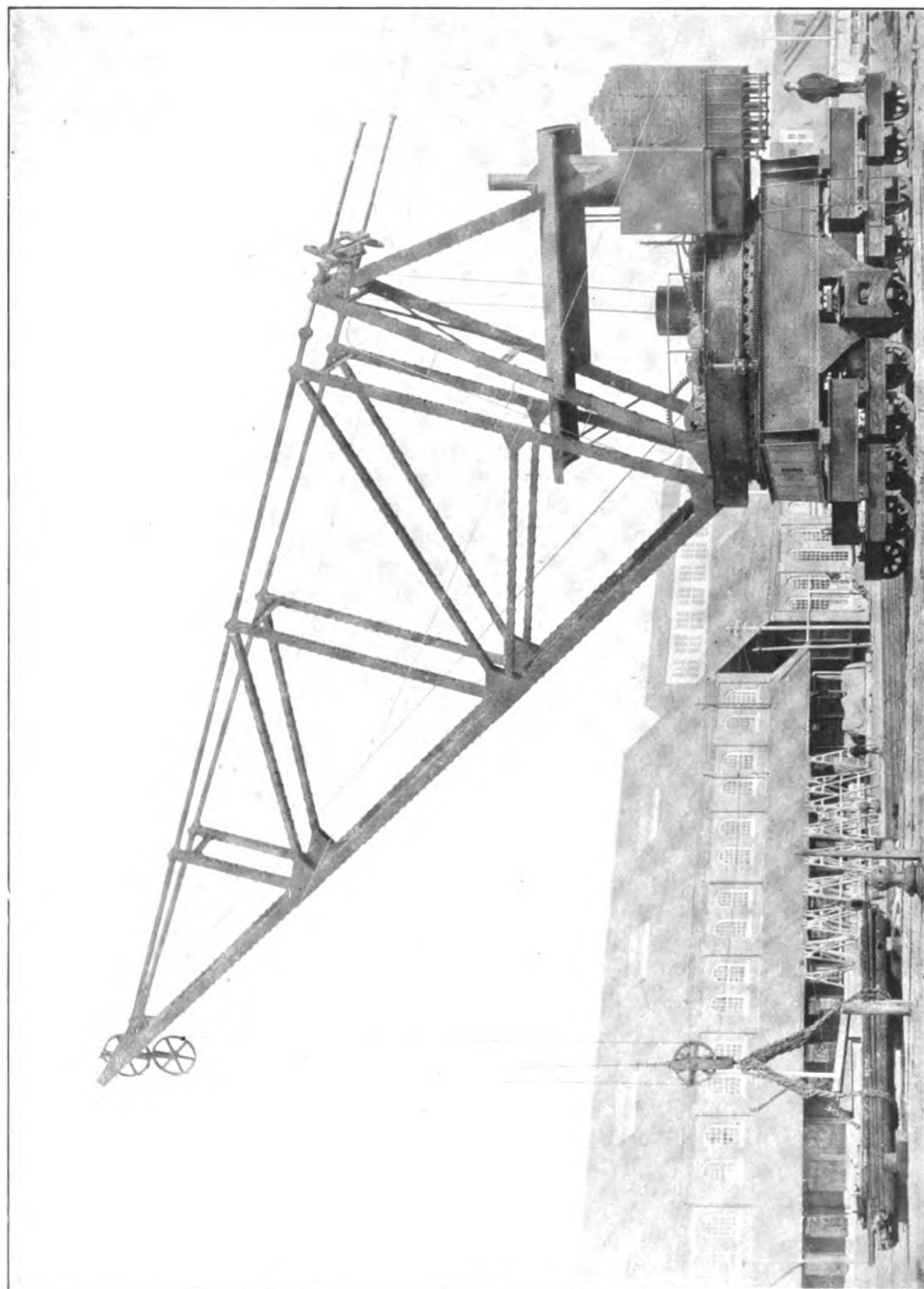
Hohenzollern, hō'en-tsōl-lörn, Germany, a province of Prussia, formed in 1849 by the union of the two principalities of Hohenzollern-Hechingen and Hohenzollern-Sigmaringen. It consists of a narrow irregular strip of country encircled by Würtemberg and Baden. Area 441 square miles; pop. about 68,000. The princely family of Hohenzollern dates from Thassilo, Count of Zollern, who died about 800 A.D., after having founded a castle near Hechingen, on the Zollern hill in the Swabian Alb. The fine Hohenzollern castle of 14th century architecture, built in the latter half of the 19th century, occupies the site of the ancient family-seat. There have been several lines and branches of the Hohenzollerns, the first separation taking place about 1165, when Frederick IV. founded the elder or Swabian and Conrad III. the younger or Franconian line. The elder line was subdivided, in 1576, into the branches of Hechingen and Sigmaringen. Frederick VI., the representative of the younger line, in 1415 received from the Emperor Sigismund the investiture of the electorate of Brandenburg, thus founding the reigning dynasty of Prussia. The two branches of the elder line continued unbroken till 1849, when the reigning princes ceded their respective rights and principalities to the king of Prussia, who in 1871 became German Emperor. The main branch of the Hohenzollerns is now represented by the imperial family of Germany. See GERMANY.

Hoisting Apparatus, mechanical devices for lifting and moving laterally heavy weights. They are known under various names and in-

clude cranes, derricks, overhead trolleys, crane-derricks, etc. The smaller are operated by hand power, the larger by steam or electric power. By their aid the heaviest weights may be readily lifted to any desired height and "slewed" into any desired position. Their use dates from the most ancient times, and they are now in constant and general use all over the world.

Derrick.—This is the simplest form of a machine for hoisting. The name is derived from a family by that title who adapted its form from the early English style of gallows, and the name has now come into common use. In form the derrick is like the letter V, one side being fixed immovably by guy ropes, the other hinged to the bottom of this fixed upright, so that it can be raised or lowered at will. This movable jib is somewhat shorter than the upright and the whole apparatus is on a platform which can turn laterally in a circle. Through the top of the jib is run a pulley block, a rope passing through this and down to the base of the upright, where it is wound about a cylinder, or winch. This, when revolved by hand or other power, winds up the rope or cable, thus raising the weight attached to the other end of the rope. The jib is lowered or raised to get the proper angle for picking up the article to be lifted. This simple form of hoister is in constant use by builders in constructing modern high buildings. By its use, heavy or light weights can be quickly lifted from the ground to the top of even 30-story structures. Derricks are commonly made of wooden spars, unless the work to be done is very heavy or the jib exceedingly long. In such case, a tubular iron spar is used. Hoisting engines of such power and facility of control are now made that they enable the operator to move the jib up or down or sideways easily and quickly. The "stiff-leg" derrick has its upright firmly braced by timbers running from the top to the ground, but this form is not common except in stone quarries or in some work where the derrick is stationary. The more common form is the guy-rope derrick, where strong wire cables extend from the top of the upright to the ground. With this arrangement, the hoisting machine can be moved and located in a fresh position easily. Derricks that will lift and swing to position weights of from 5 to 50 tons are now made in this country. In the contemplated work on the Panama Canal, derricks capable of moving 100-ton loads of stone and rock are to be built, with a radius of over 100 feet for the jib.

Crane.—Thus named because the arm or boom resembles the neck of the crane, which raises and lowers its neck to lift objects from the ground. It differs from the derrick in not having any mast or upright, usually. In the common form of crane the whole apparatus is centered upon a heavy platform which is itself on wheels. The engine which operates the winch also slews the boom in a circle, and, in some cases, moves the whole outfit along the rails upon which the wheeled platform rests. At the base of the boom, on the platform, is an inverted "V" horse, to which are attached the pulley blocks through which run the ropes for raising and lowering objects to be lifted. In large foundries, ship-yards and like places, the locomotive crane runs upon a track which usu-



FORTY TON LOCOMOTIVE CRANE.
IN USE BY THE U. S. GOVERNMENT AT PORT ROYAL, S. C.

Univ. Library, UC Santa Cruz 2001

ally extends the length of the yard or shop, or perhaps clear around it. Under its own steam, the ponor-ous machine runs along this track to the object it is desired to move. Steam power then slews the machine laterally so that the end of the jib or boom is over the object, when the latter is attached to the rope running over the end of the jib, the winch turned by the engine and the object lifted into the air. A second rope over another winch then raises the jib to the desired height and the machine runs back over the track to the point desired, where the object is deposited. The utmost expertness and delicacy of handling is acquired by the operator of this steam locomotive crane, which will thus grasp and carry where desired objects weighing often 50 tons or more. The common size is the one capable of lifting five tons only, though there are at Port Royal, in the United States navy yards, several large cranes which just as easily lift 50 tons. This latter machine has a boom 85 feet long and will travel under its own steam along the track 50 feet per minute. It will hoist a 40-ton load seven feet per minute and slew, or turn, a complete revolution in two minutes. The smaller cranes are much used on flat cars as wrecking apparatus for railroads, in excavating and dredging and in heavy construction work. Scores were used in digging the subway for New York city. A small 5-ton locomotive crane costs about \$7,500. This style of hoisting apparatus is peculiarly the product of American genius and machines made in America are found in all large contracts for bridge building, railroad construction and like work in every corner of the world. A new machine for placer mining installed in New Mexico in the summer of 1903 adopts this form of crane, using the water over and over for sluicing the sand. It also operates a clam-shell shovel. In more difficult digging the "orange peel" form of shovel is used, the crane raising a ton or more of earth in the shovel and depositing it where desired.

Overhead Trolleys.—In the yard of a ship-building company at New London, Conn., has been installed a system of overhead hoisters which combine the advantages of both the derrick and the crane advantageously. The two enormous steamships, Minnesota and Dakota, were constructed by its aid solely. The two ships were built side by side and one trolley system served for both. By this method there are three steel spars, each 120 feet long, each supporting a steel cross-yard 174 feet long. These masts are braced by immense steel guy ropes or cables. The distance between the masts is 300 feet and the tops of the yards, or jibs, are 84 feet from the ground. The working field of the trolleys is a rectangle 600 feet long and 174 feet wide. Along the jibs a track made of wire rope is laid, on which a carriage is swung, suitably centred and controlled. On the main mast, just below the yard, is the house containing the operator and engine. This one man controls the trolley carriages on all the jibs, the raising or lowering and slewing of the jibs and masts and the return of the trolley carriages to the point desired. All is done swiftly and accurately, each carriage being capable of carrying 5,000 pounds. This system can operate four of these trolleys when desired.

Crane-derrick.—This is a combination of the crane and the derrick, as its name indicates. It

resembles a figure 4 in construction. The mast can be slewed, but the yard or jib is a fixture and cannot be raised or lowered. Near the juncture of the jib and mast is the house in which sits the operator and where the engine is located. Along the under side of the jib is suspended a wire cable track on which runs a grapple carriage. The jib is usually very long, at least 60 feet, and the grapple runs to the end of this or to such point as is desired to be attached to the object to be lifted. This form of hoister is much used in bridge building and in places where a long reach of jib is desired.

At least 25,000 hoisting machines of these various types are made annually in the United States, one fifth of which are exported. About \$25,000,000 is the annual expenditure for this class of machines, aside from the cost of hoisting engines, ropes, wire cable and the other appurtenances of the trade. The largest locomotive cranes cost \$50,000 and the small wooden derrick \$300 to \$1,000. The industry has grown to enormous proportions and new improvements in methods of hoisting are constantly being made for special purposes.

PUTNAM DREW.

Hokusai, hō-koo-sā'ē. See JAPANESE ART.

Holacan'thus. See BUTTERFLY-FISH.

Holbach, Paul Heinrich Dietrich, powl hīn'rih dēt'rih hōl'bāk (Fr. ōl-bāk), BARON VON, German philosophical writer: b. Heidelberg, in the Palatinate, 1723; d. Paris 21 June 1789. He was educated in Paris, where he passed the greater part of his life. He was the centre of a circle of men of wit, but of free thinking principles, using his great fortune, says Rousseau, generously, and appearing to advantage in the learned society which he gathered round his table. He was the author of a great number of works, most of which were anonymous or pseudonymous. The principal work attributed to him, which appeared in 1770 under the name of M. Mirabaud, and excited much attention in the learned world, is the 'Système de la Nature ou les Lois du Monde physique et moral.' He afterward published 'Système social, or Principes naturels de la Morale et de la Politique'—a development of the previous work, showing the application of the principles promulgated in it to morals and politics; 'Bons Sens, or Idées naturelles opposées aux Idées surnaturelles'; 'Eléments de la Morale universelle'; etc. According to Holbach matter is the only form of existence, and everything is the effect of a blind necessity.

Holbein, Hans, hānts hōl'- or hōl'bin, the Elder, German painter: b. Augsburg 1460; d. Alsace 1524. His art training began under the influence of Martin Schongauer, but he quickly launched out into a new style, which left ancient precedents behind. He developed a dramatic energy, a clear and lifelike coloring and pre-eminent distinction of expression which rendered him the acknowledged head of a new school. His figures took the attitude of life. The pictures over the altar in the Cathedral at Augsburg, painted in 1493, are good specimens of his best work; in them are portrayed incidents in the life of Virgin Mary. To the same class belong the remains of an altarpiece in the Dominican Church at Frankfort-on-Main, representing scenes of the Passion (1501); 16 paintings of the Passion in the Munich Gallery; the

portrait of the artist with his two sons, in the gallery at Augsburg. His later pictures show traces of the influence exercised by the Italian renaissance, and those painted about 1512 and later are vastly superior to his early work. Among them is his 'Fount of Life' (1519), now in the royal gallery at Lisbon; the altarpiece 'St. Sebastian' (1515), at Augsburg; the altarpiece 'St. Katharine,' in the same gallery; etc. In such works the bold and devotional conception, delicacy and directness of expression, ease of drawing and splendor of coloring, are beyond praise. Excellent also are some of his preliminary sketches and outlines, and in Basle, Berlin, and Copenhagen are collections of his pencil sketches, the most remarkable of which is that at Berlin. Consult: Woltmann, 'Holbein und seine Zeit' (1866).

Holbein, Hans, the Younger, German painter: b. Augsburg 1497; d. London Nov. 1543. He probably received instruction in painting from his father, and about 1515 went to Basle, where he engaged in illustrating books. At Basle he also painted his earliest portraits, and in 1517 went to Lucerne. Here he painted the house of Jacob von Hertenstein, designed windows, and executed other works. Returning to Basle in 1519, he became a burgher in the following year, and during a seven years' residence in that city he executed many works of great importance. In 1526 he went to England. Letters from his friend Erasmus, whose famous 'Praise of Folly' he had illustrated, procured him the patronage of the chancellor, Sir Thomas More, who employed him to delineate the portraits of most of his own personal friends about the court, and introduced him to the notice of Henry VIII., who was a liberal encourager of the fine arts. Among the portraits produced by him during this period are those of More, Archbishop Warham, Bishop Fisher, and several other distinguished persons. From 1528 till 1532 he was again in Basle, but in the latter year he returned to England, where he was destined to spend nearly all the remainder of his life. Holbein painted most of the principal English nobility, whose portraits place him among the world's greatest portrait-painters. Some of his earlier productions, especially his 'Dance of Death,' are also celebrated. In 1538 he completed and published this series. Among the pictures of Holbein's last period are 'The Ambassadors' (1533), and portraits of Hans of Antwerp (1532), English Lady and Gentlemen (1534), Sir Richard Southwell (1538), Duke of Norfolk (1539), Thomas Cromwell, Lady Jane Seymour, Henry VIII. (1542, unfinished), and others. Comparatively few of Holbein's pictures are still extant in England, great numbers of them having been destroyed by Puritan fanatics, or sold and dispersed over Europe. Many of them also perished in the great fire in London in 1666. Holbein also excelled in wood-engraving, and before his visit to England had produced a large number of wood-cuts. He was one of the earliest to paint portraits in miniature. See Woltmann, 'Holbein und seine Zeit' (1874); Wornum, 'Life and Works of Holbein' (1867); Knackfuss, 'Holbein der Jüngere' (1896).

Holberg, Ludwig, lood'vîg høl'bêrg, BARON, Danish author: b. Bergen, Norway, 3 Dec. 1684; d. Copenhagen, 28 Jan. 1754. He studied at Copenhagen, Oxford and Paris, and

after paying a six months' visit to Rome returned to Copenhagen in the end of 1716. In 1718 he was appointed to an ordinary professorship in the university of that city, where after this date he chiefly resided till his death. In 1735 he was unanimously elected rector, and in 1737 treasurer of the university, and in 1747 was raised to the rank of baron. Holberg's numerous productions in various departments of literature as well as the important and salutary influence which he exercised upon his countrymen, place him in the front rank of the literary men of his age. He was extremely versatile—now devoted to history, now to poetry, and now to the drama; but during his whole life he was a sworn enemy to pedantry, theological disputatiousness, and scholastic metaphysics. His works may be divided into four classes—poems, stage pieces, philosophical treatises, and historical works. His poems are chiefly of a satirical nature. The most celebrated among them is 'Peder Paars,' a comic heroic poem in 14 cantos, still regarded throughout the Scandinavian countries as a masterpiece, and the hero of which has become the national comic impersonation in Denmark. It has been translated into several languages. Almost equally famous is his 'Nicholas Klimm's Subterraneous Travels,' a satirical romance in prose, originally written in Latin, but translated into seven modern European languages shortly after it appeared, into Danish first by Baggesen (1789). His numerous stage pieces are either comedies or farces, and nearly all characterized by true comic power. Among his philosophical writings the most important is his 'Moral Reflections' (1744). His historical works include: 'The Political, Ecclesiastical, and Geographical Condition of the Danish Monarchy,' a work of great value as a source of reference; 'A General History of the Jews,' and 'A History of Famous Men and Famous Women' (1739-45).

Holbrook, John Edwards, American naturalist: b. Beaufort, S. C., 30 Dec. 1794; d. Norfolk, Mass., 8 Sept. 1871. He was graduated from Brown in 1815, from the medical school of the University of Pennsylvania in 1818, began practice at Charleston, S. C., in 1822, and in 1824 was appointed to the chair of anatomy in the Medical College of South Carolina, a post he held for over 30 years. In the Civil War he was head of the South Carolina examining board of surgeons. His 'American Herpetology, or a Description of Reptiles Inhabiting the United States' (1842), won for him recognition among European scientists. He published but 10 numbers of his 'Ichthyology of South Carolina' (1854 *et seq.*), when the Civil War compelled its discontinuance.

Holcomb, Silas Alexander, American jurist: b. in Gibson County, Indiana, 25 Aug. 1858. He received a common school training, studied law in Nebraska, and in 1891 was made judge of the 12th judicial district. He was governor of Nebraska from 1894 to 1898, having been elected by fusion of the Populist and Democratic voters. He has been justice of the supreme court of Nebraska from 1900.

Holcombe, Chester, American diplomatist and author: b. Winfield, N. Y., 16 Oct. 1844. He was graduated at Union College in 1861; and served as interpreter and secretary to the United States Legation in China, 1871-85. Becoming an authority on the Chinese and Chinese

HOLDEN—HOLIDAY

affairs, in 1896 he acted for the Chinese government in its financial embarrassments. He has published: 'Travels in Western China' (1875); 'The Practical Effect of Confucianism upon the Chinese Nation' (1882); 'The Real Chinaman' (1895); 'The Real Chinese Question' (1899).

Holden, hōl'dēn, Albert J., American musician: b. Boston 1841. He studied music in New York, and since 1855 has been organist at the Church of the Divine Paternity and at the Church of the Puritans. He has composed more than 300 anthems, hymns and other church music, but his compositions are not confined to sacred music; they include songs, ballads, and choruses; he has also edited and compiled numerous collections.

Holden, Albert W., English painter: b. London 6 July 1848. He studied drawing and antiquities at the British Museum, and gained a studentship at the Royal Academy of Arts, where he afterward exhibited. He has painted historical and humorous genre pictures, and has a high reputation as a portrait painter. Since 1887 he has been professor of fine arts, King's College, London. Among the well known works he has exhibited are: 'A Bank Holiday' (1883); 'Naughty Polly' (1898); 'The Annunciation' (1896); etc.

Holden, Edward Singleton, American astronomer: b. St. Louis, Mo., 5 Nov. 1846. He was graduated at Washington University in 1866, and at the United States Military Academy in 1870; was professor of mathematics at the Naval Academy in 1873-81; and director of the Washburn Observatory (Madison, Wis.) in 1881-5. In 1885-7 he was president of the University of California, and in 1888-98 director of the Lick Observatory, on Mount Hamilton, San José, Cal. It was in connection with the Lick Observatory that his most important work was done, and his services to astronomy found recognition in America and from European states. Among his publications are: 'Index Catalogue of Nebulae' (1877); 'Life of Sir William Herschel' (1881); 'Astronomy' (with S. Newcomb, 1892); 'Mountain Observatories' (1896); 'Essays in Astronomy' (1900).

Holden, Sir Isaac, English inventor: b. Hurler, near Paisley, 7 May 1807; d. Reighley, Yorkshire, 13 Aug. 1897. While a worker in a cotton mill in Paisley he fitted himself for the post of a teacher. While conducting an experiment he discovered the lucifer match, but he secured no patent on the invention, the financial benefit of which fell to others. Subsequently he was manager, then owner of a wool-combing establishment, and by his mechanical improvements made significant changes in that industry. His shops at Bradford, with branches at Croix and Rheims, eventually became the largest of the kind in the world. He was several times elected to Parliament in the Liberal interest.

Holder, hōl'dēr, Charles Frederick, American naturalist: b. Lynn, Mass., 5 Aug. 1851. He studied at the United States Naval Academy, but resigned in 1871; in 1871-5 was assistant curator of the American Museum of Natural History, from that time turned his attention to lecturing and literary work, and became known as a leading writer on popular science. At Pasadena, Cal., whither he removed in 1885, he be-

came president of the board of education, professor of zoology in Throop University, and honorary curator of the university museum. Among his publications are: 'Elements of Zoology' (1885); 'Living Lights' (1887); 'Louis Agassiz, his Life' (1892); 'Along the Florida Reef' (1892); 'Stories of Animal Life' (1900); 'Half-Hours with Nature' (1901).

Holds'worth, Annie E., English novelist: b. Jamaica. She was married to Eugene Lee-Hamilton, the poet, in 1898. She has been co-editor of 'The Woman's Signal,' with Lady Henry Somerset, and is the author of the popular novels: 'Joanna Traill, Spinster'; 'The Years that the Locust Hath Eaten'; 'Spindles and Oars'; 'The Gods Arrive' (1897); etc.

Hole, Samuel Reynolds, English Anglican clergyman: b. 5 Dec. 1819; d. Rochester, Eng., 27 Aug. 1904. He was educated at Oxford, took orders, was ordained in 1845 and was vicar of Caunton, 1845-87. From 1887 he was dean of Rochester Cathedral. He visited the United States on a lecture tour in 1896, where his humorous, anecdotal lectures were very popular. He was a recognized authority on rose culture and wrote: 'A Book about Roses,' which has reached its 15th edition; 'The Memories of Dean Hole'; 'More Memories'; 'Addresses to Working Men'; 'A Little Tour in America'; 'Our Gardens' (1899); 'Then and Now' (1901); etc.

Hole, William, English painter: b. Salisbury 7 Nov. 1846. He was destined for the profession of engineering but after a journey to Italy turned his attention to art. He studied at the Edinburgh school of art, and in 1889 was elected member of the Royal Scottish Academy. His versatility is shown by the excellence of his work in portrait, genre and fresco, while as an engraver he has made many famous plates after such masters as Millet, Constable and Millais. Among his best known paintings are: 'The End of Forty-Five' (1879); and 'News of Flodden' (1886).

Holguin, ōl-gēn', Cuba, city in the province of Santiago de Cuba; about 25 miles by rail south by west of Gibara, its port; and 70 miles northwest of the city of Santiago de Cuba. Fertile agricultural lands are in the vicinity, also on the southwest is a hilly section bordering on the interior mountain range. A noted cave is in the vicinity. The trade is chiefly in sugarcane and tobacco. Pop. 6,500.

Hol'ibut. See HALIBUT.

Hol'iday, any day set apart as a religious or national festival. (See FESTIVALS.) Certain days are fixed by law as bank-holidays for England and Scotland, and it is enacted that all business transactions which would have been valid on any such holiday shall be held as valid if performed on the day following. Thus, when a bill of exchange becomes due, or notice of dishonor falls to be given, on a bank-holiday, the bill is payable, or the notice stands good on the following day. The days fixed for England are Easter Monday, the Monday in Whitsun Week, the first Monday in August, and the 26th of December if a week-day. These are in addition to Christmas Day, Good Friday, and other holidays previously established. The days fixed as bank-holidays for Scotland are New Year's

Day, Good Friday, the first Monday of May, the first Monday of August, and Christmas Day; and if either New Year's Day or Christmas Day falls on a Sunday, the Monday after is held as a holiday. The same act empowers the sovereign to appoint by proclamation a special day to be observed as a bank-holiday, and to alter by order in council any of the days settled by the act.

In the United States there is no national holiday, not even 4 July. The 53d Congress passed an act making Labor Day a public holiday in the District of Columbia, and various States have followed with a similar act. The proclamation of the President designating a day of Thanksgiving only makes it a legal holiday in the District of Columbia and in the Territories. New Year's Day is a legal holiday in all the States except Massachusetts, Mississippi, and New Hampshire. Lincoln's Birthday (12 Feb.) is a legal holiday in Connecticut, Illinois, Minnesota, New Jersey, New York, North Dakota, Pennsylvania, Washington, and Wyoming. Washington's Birthday (22 Feb.) is a legal holiday in all the States except Mississippi. Decoration Day (30 May) in all the States except Alabama, Florida, Georgia, Idaho, Louisiana, Mississippi, North Carolina, South Carolina, and Texas. Independence Day (4 July) in all the States and Territories. Labor Day (in general, the first Monday in September) in all the States except Arizona, Mississippi, Nevada, and North Dakota. Election Day and Christmas Day are generally observed as legal holidays in all the States and Territories. There are various States holidays, such as Patriot's Day (19 April) in Massachusetts, Pioneer's Day (16 Aug.) in Utah, All Saints' Day (1 Nov.) in Louisiana, Admission Day (9 Sept.) in California, and Confederate Memorial Day (10 May) in North and South Carolina. Every Saturday after 12 o'clock noon is a legal holiday in New York, New Jersey, Pennsylvania, Maryland, Tennessee, Virginia, in the city of New Orleans and in Newcastle County, Delaware.

Holinshed, hōl'inz-hēd, Raphael or Ralph, an English chronicler: d. about 1580. He is only known by his 'Chronicles of Englande, Scotlande, and Irelande,' the first edition of which, known as the "Shakespeare edition," because it is the one the poet is supposed to have used in collecting material for his historical plays, was published in London in 1577. In the preparation of this work Holinshed was assisted by several of the most learned men of the day.

Holl, Frank, English portrait and genre painter; son of Francis Holl, an eminent engraver: b. London 4 July 1845; d. there 31 July 1888. He was a very successful student at the Royal Academy, and exhibited constantly from his student days. Among his best-known pictures are: 'Faces in the Fire'; 'Fern-Gatherers'; 'No Tidings from the Sea'; 'Leaving Home'; and the 'Gifts of the Fairies.' In the later portion of his career he devoted himself to portraiture, in which he greatly excelled, and painted many of the celebrities of the day.

Holland, Edmund Milton, American actor: b. New York 7 Sept. 1848. He began his professional career at Barnum's Museum in 1866, was later for 13 years a member of Lester

Wallack's company, and as a member of the Madison Square company from 1882 created the parts of Captain Redwood in 'Jim the Penman,' Colonel Moberley in 'Alabama,' and the title-role in 'Colonel Carter of Cartersville.' In 1895-7 he starred with his brother Joseph, and later (1901) appeared as Eben Holden in the dramatization of Irving Bacheller's book of that name.

Holland, Frederic May, American author: b. Boston 2 May 1836; d. Concord, Mass., 17 May 1908. He was graduated from Harvard in 1859, entered the ministry of the Unitarian Church in 1862, but resigned in 1874. He wrote: 'The Reign of the Stoics' (1879); 'Frederick Douglass, the Colored Orator' (1895); and 'Liberty in the Nineteenth Century' (1899).

Holland, Henry Richard Vassall Fox, 3d Lord, English statesman: b. Wiltshire 21 Nov. 1773; d. 22 Oct. 1840. He succeeded to the peerage by the death of his father when less than one year old. In 1798 he took his place in the House of Lords, and as the nephew of Charles James Fox was at once acknowledged as a Whig leader. In 1806 he was commissioner for settling disputes with the United States; was lord privy seal in 1806-7; and chancellor of the duchy of Lancaster. He made Holland House the resort of the wit, talent, and beauty of his day. He was the author of: 'Life of Lope de Vega' (1806); 'Three Comedies from the Spanish' (1807); 'Foreign Reminiscences' (1850); 'Memoirs of the Whig Party' (1852).

Holland, John P., American inventor: b. 1841. As one of the most successful designers in the interesting field of submarine navigation, Holland is well known. His first boat was built in 1875; a second was launched in 1877, and a third in 1881. After a series of severe tests, the Holland boat was ordered by the United States government for the navy in 1900. In 1903 eight of the submarines were put in commission. These have a speed varying from 8.87 to 8 knots, a horse-power of 160 (with one exception), and a displacement in general of 122.55 tons. For some time the inventor was interested in the Holland Submarine Boat Company, but from this he has now retired to devote his time independently to submarines and flying devices. His more recent designs call for smaller and more compact vessels, with much less complicated mechanism, power of remaining longer submerged, and increased safety in operation. See SUBMARINE NAVIGATION, HISTORY OF.

Holland, Josiah Gilbert, American editor and author: b. Belchertown, Mass., 24 July 1819; d. New York 12 Oct. 1881. He began the study of medicine in 1840, in 1844 was graduated from the Berkshire Medical College, and entered practice at Springfield, Mass. The years that followed were discouraging, for patients did not come to the young doctor. With true Yankee versatility he turned his hand to anything,—taught district school, was a traveling writing-master, and a daguerreotypist. Of his boyish mortification at being a mill hand he has written in 'Arthur Bonnicastle.' He tried editorial work, and started 'The Bay State Weekly Courier,' which ran for six months. Subsequently he taught at Richmond, Va., and for 16 months

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was superintendent of public schools at Vicksburg, Miss. All these varied experiences gave him the knowledge of American life and appreciation of workaday struggles which later made the value of his poems, essays, and novels. In 1849-66 he was assistant editor of the *Springfield Republican*, and from 1851 also part owner of that journal. It was largely due to his influence that the *Republican* became so widely known and popular a journal. In it his 'Letters to Young People Married and Single: By Timothy Titcomb' first attracted readers by their vivacious style, moral sincerity, and good common sense. Later, in book form (1858) they had a great and immediate success.

In 1870 Dr. Holland was one of the founders and became editor of 'Scribner's Monthly,' later the 'Century Magazine,' and the editorship of this periodical he retained till his death in 1881. Holland's novels: 'Arthur Bonnicastle' (1873); 'Sevenoaks' (1876); and 'Nicholas Minturn' (1877), although showing his quick and sympathetic observation and containing fine passages, have been less popular than his poems. The latter, in their constant appeal to the moral sense, and in their accurate portrayal of the homely and picturesque in New York life, found many admirers. Several of the short lyrics, with 'Bittersweet' (1858); 'Kathrina' (1868), and 'The Mistress of the Manse' (1871), came as messages of an American poet who understood and honored his own people. Consult the 'Life' by Plunkett (1894).

Holland, Thomas Erskine, English jurist: b. Brighton 17 July 1835. He studied at Oxford, was called to the bar in 1863, in 1874 became a reader in English law at Oxford, and shortly afterward professor of international law. The University of Perugia appointed him to an honorary professorship in recognition of his attainments. His best-known work is his 'Elements of Jurisprudence' (1880; 9th ed. 1900), to which was awarded the Swinney prize (1894), decennially bestowed for the best book published on jurisprudence, and which is now a standard text-book in England and the United States. He wrote further: 'An Essay on Composition Deeds' (1864); 'Essays on the Form of the Law' (1870); 'The European Concert in the Eastern Question' (1885); 'Studies in International Law' (1898), and other works.

Holland, William J., American Presbyterian clergyman and educator: b. Jamaica, W. I., 16 Aug. 1848. He was graduated from Amherst College in 1869, from the Princeton Theological Seminary in 1874, entered the ministry of the Presbyterian Church, and was a pastor at Pittsburg, Pa., in 1874-91. In 1891-1901 he was chancellor of the Western University of Pennsylvania (Allegheny), and in 1897 was appointed director of the Carnegie Museum at Pittsburg. In 1887 and 1889 he was naturalist of the United States eclipse expeditions to Japan and West Africa respectively. A recognized authority on museum administration and zoology, he wrote numerous scientific papers in learned publications, and 'The Butterfly Book' (1898).

Holland, a popular designation for the Kingdom of the Netherlands, derived from the provinces of North and South Holland, form-

erly constituting a feudal countship allied to the Holy Roman-German Empire, and from 1806-10 with other parts of the Netherlands, Hanover, and Oldenburg, ruled by Louis Bonaparte as the Kingdom of Holland. The region is the seat of the hardy and industrious Dutch race and of the Dutch language called by the natives *Nederduitsch*, a dialect of Low German phonology, with evolutionary periods of Old, Middle, and Modern, and an interesting historical and varied literature. See NETHERLANDS.

Holland, Mich., city, in Ottawa County, at the head of Black Lake, which is really an arm of Lake Michigan, and on the Père Marquette railroad; about 80 miles west of Lansing and 25 miles southwest of Grand Rapids. It has direct communication by steamers with Chicago, Milwaukee, and other lake ports. Holland was settled in 1847 by a Dutch colony, and many of its inhabitants are of Dutch descent. In 1867 it was chartered as a city. It is located in an agricultural region, once a lumber section. The manufactures are largely articles made of wood, but the beet-sugar industry is growing in importance. The chief manufacturing establishments are planing-mills, furniture, tub, and basket factories, flour-mills, tanneries, wood-working machinery shops, pickling-plants, beet-sugar factory, grain elevators, and creameries. The manufacture of launches is also an important industry of Holland. The trade is chiefly in the manufactures, and in grain and vegetables. The city owns and operates the electric-light plant and the waterworks. Holland is the seat of the Western Theological Seminary and of Hope College, both under the auspices of the Reformed Church in America. It has a number of fine public buildings, and a free public library. The summer resorts on Black Lake add to the industrial wealth of the city. Pop. (1890) 3,945; (1900) 7,790; (1910) 10,490.

Holland-linen, a fine and close fabric, so called from its first being manufactured in Holland; also a coarser linen fabric, unbleached or dyed brown, used for covering furniture, carpets, etc.

Hol'lander, Jacob H., American economist: b. Baltimore, Md., 23 July 1871. He was educated in the Baltimore schools and graduated from Johns Hopkins University in 1891, receiving his Ph. D. degree in 1894. His ability as economist and financier was soon recognized, and he became associate professor of finance at Johns Hopkins. In 1897 he was appointed secretary of the Bimetallic Commission abroad and was chosen chairman of the Baltimore municipal lighting commission in 1900. In the same year the secretary of war appointed him special commissioner to revise the laws relating to taxation in Puerto Rico, and while engaged in this service he was made treasurer of Puerto Rico by President McKinley.

Hollar, Wenzel or Wenceslaus, věnt'zěl or wěn'sēs-lās hól'lār, Bohemian engraver: b. Prague 13 July 1607; d. London 28 March 1677. He accompanied the Earl of Arundel, English ambassador to Germany, to London, who employed him to engrave some of the pictures of his collection. Among his numerous works, which are greatly esteemed for their delicate,

HOLLEBEN — HOLLOWAY

firm, and spirited execution, and which include some 2,740 plates, are the set of 28 plates, entitled, 'Ornatus Muliebris Anglicanus,' representing the dresses of Englishwomen of all ranks and conditions in full-length figures; Holbein's 'Dance of Death,' etc.

Holleben, hōl'lā-bēn, Theodore von, German diplomat: b. Stettin, Pomerania, 16 Sept. 1838. He was educated at the universities of Heidelberg, Berlin, and Göttingen; became an officer in the Body-Guard Hussar Regiment; and took a distinguished part in the Franco-Prussian War. He entered the diplomatic service in 1872; was *chargé d'affaires* at Peking, China, 1873-4, and at Tokio, Japan, in 1875; minister at Buenos Ayres in 1876-84; at Tokio 1885-9; and at Washington, D. C., 1892-3. In 1897 he became ambassador extraordinary and plenipotentiary to the United States. At the command of Emperor William he, together with Secretary Hay, of the State Department, had charge of the arrangements for the official reception of the emperor's brother, Admiral Prince Henry, in February 1902. Failing health caused his resignation, and in 1903 he was succeeded by Baron Speck von Sternberg.

Holley, Alexander Lyman, American engineer: b. Lakeville, Conn., 20 July 1832; d. Brooklyn, N. Y., 29 Jan. 1882. He was graduated at Brown University in 1853, and became editor of 'The Railroad Advocate' in 1856, changing its name to 'The American Engineer.' He introduced into the United States in 1865 the Bessemer steel process, erecting the first Bessemer works in the country at Troy, N. Y. He was lecturer on the manufacture of iron and steel at Columbia University 1879-82. Holley secured many patents, the most important probably being that for the detached converter-shell, an improvement in the Bessemer process. He published with Z. Colburn: 'Railway Economy: a Report on European Railways' (1858); 'American and European Railway Practice' (1860); 'A Treatise on Ordnance and Armor' (1865); etc. In 1890 a bronze bust of Holley was placed in Washington Square, New York, by the mechanical engineers of the United States and Europe.

Holley, Marietta, American author, known by her pseudonym, "JOSIAH ALLEN'S WIFE": b. near Adams, Jefferson County, N. Y., 1844. She began her literary career as a contributor to the 'Christian Union,' the 'Independent,' 'Peterson's Magazine,' and other periodicals; and in 1873 published her first book, 'My Opinions and Betsy Bobbet's,' which in a measure recalled the 'Widow Bedott Papers' of F. M. Whitchee. This was followed by a series of works containing many touches of distinctive and genuine humor: 'Samantha at the Centennial' (1876); 'My Wayward Pardner' (1880); 'Miss Richard's Boy' (1882); 'Sweet Cicely' (1885); 'Miss Jones's Quilting' (1887); 'Samantha at Saratoga' (1887); 'Poems' (1887); 'Samantha Among the Brethren' (1891), considered by many her best volume; 'Samantha at the World's Fair' (1893), and others. Her writings have had large sale, and been translated into several foreign tongues.

Hollidaysburg, hōl'l-dāz-bérg, Pa., borough, county-seat of Blair County: on the Juniata

River, and the Pennsylvania railroad; about 8 miles east of Pittsburgh and five miles south of Altoona. Rich coal-fields, iron-ore beds, and limestone quarries are in the vicinity. The chief manufactures are foundry products, agricultural and mining implements, nails, and furniture. Hollidaysburg Female Seminary is a prosperous institution. Pop. (1910) 3,734.

Hol'lins, Alfred, English musician: b. Hull 1865. He was born blind, and was educated at an institution for the blind in York, and at the Royal Normal College for the Blind in Upper Norwood, where he specialized in music (piano and organ); he also studied music in Germany. He was popular at the English and German courts, where he gave recitals; and was for a time organist at the United Free Saint George's Church in Edinburgh. He visited America in 1886 and 1888, and his organ compositions are widely known and liked throughout the United States.

Hollins, George Nichols, American naval officer: b. Baltimore, Md., 20 Sept. 1799; d. there 18 Jan. 1878. He entered the navy as midshipman in 1814, and while assigned to the President, Stephen Decatur, was captured by the English and held prisoner at Bermuda until the conclusion of peace. He served also in the Algerine war of 1815, later assumed command of an East Indiaman, and in 1844 attained commander's rank. In 1855, on complaint of American residents who claimed they had been injured by the local officials, he bombarded Greytown, Nicaragua. At that time Nicaragua was under English protection, and the property and lives of English residents having been imperilled, international complications with Great Britain arose. Hollins was commissioned commodore in the Confederate navy at the outbreak of the Civil War, attacked the Federal blockading squadron at the passes of the Mississippi River, and was appointed flag-captain of the New Orleans station. He was superseded in 1862.

Hol'lister, Cal., town, county-seat of San Benito County; on the Southern Pacific railroad; about 80 miles southeast of San Francisco, and 35 miles east by south of Santa Cruz. It is situated in a rich agricultural region, noted for its fruit. The chief industrial interests of the town are connected with dairying, fruit-growing, and the shipment of grain and live-stock. Pop. 1,500.

Holloway, hōl'ō-wā, Laura Carter, American author: b. Nashville, Tenn., 22 Aug. 1848. She was at one time editor of the 'Home Library Magazine' of Chicago, Ill., was for 12 years associate editor of the Brooklyn *Daily Eagle*, and collaborated with Anton Seidl in the preparation of musical terms for the 'Standard Dictionary.' She wrote: 'Ladies of the White House' (1870); 'The Mothers of Great Men and Women' (1884); 'The Home in Poetry' (1884); 'Chinese Gordon' (1885); 'The Buddhist Diet Book' (1887); and other volumes.

Holloway, Thomas, English patent medicine proprietor and philanthropist: b. Devonport 22 Sept. 1800; d. Tittenhurst 26 Dec. 1881. About 1837 he began to sell his well-known ointment, and soon afterwards brought his pills to the notice of the public. He ultimately

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succeeded in amassing a very large fortune which he partly devoted to benevolent objects. The Royal Holloway College for Women, on the equipment and endowment of which he expended about \$4,000,000 was opened on 30 June 1886. It contains a collection of pictures valued at \$500,000. Near it is a sanatorium founded by him for the mentally afflicted of the lower middle class.

Holls, hōlz, George Frederick William, American lawyer and statesman: b. Zelenople, Pa., 1 July 1857; d. Yonkers, N. Y., 23 July 1903. He was graduated from Columbia in 1878, and from the law school there two years later. He was admitted to the bar and established a large law practice in New York city, becoming senior member of the firm of Hollis, Wagner & Burghard; in his later life he visited Europe frequently and became widely known there, especially in Germany where he established a branch of his law firm. He was prominent in philanthropic work, being for years an officer of the Legal Aid Society and a director of the Charity Organization Society. He was also an active member of the Republican party, and much in demand as a campaign speaker, especially as he could address the Germans in their own language. In 1893 he was a delegate-at-large to the New York Constitutional Convention, where he was chairman of the committee on education, a member of the committee on cities, and author of several amendments. His frequent visits abroad gave him a wide and intelligent interest in international questions, and at the time of the Hague Conference he was very influential in arousing interest and obtaining a large delegation from the United States. He was secretary of the American delegation at the Conference (1899), was the American member of the committee which drafted the arbitration treaty, and author of the clause on "Special Mediation." He was afterward appointed a member of the permanent international court of arbitration. A few months before his death President Roosevelt asked him to umpire the adjustment of claims between Germany and England and Venezuela, but he declined. He has written: 'Sancta Sophia and Troitza' (1888); 'Compulsory Voting' (1891); and 'The Peace Conference at the Hague and Its Bearings on International Law and Policy' (1900).

Holly, James Theodore, American Protestant Episcopal bishop: b. Washington, D. C., 3 Oct. 1829. He was of African Roman Catholic parentage, but withdrawing from the Roman Catholic Church, entered the Episcopal Church in 1851, studied for the ministry and in 1856 became rector of St. Luke's, New Haven, Conn. In 1874 he became missionary bishop of Haiti.

Holly. See AQUIFOLIACEÆ.

Holly Springs, Miss., a point on the Mississippi Central Railroad, about 40 miles southeast of Memphis and about 25 miles south of Grand Junction, on the Memphis & Charleston Railroad, and an important strategical point. After the battle of Iuka, 19 Sept. 1862, and the Confederate defeat at Corinth, 3-4 Oct. 1862, the Confederates fell back to Holly Springs. Early in November Gen. Grant had concentrated an army of 30,000 men in the vicinity of Grand

Junction to make a movement along the line of the Mississippi Central Railroad in the direction of the rear of Vicksburg. On 8 November Gen. McPherson, with 10,000 infantry and 1,500 cavalry, advanced from Grand Junction southward and pushed the Confederates under Gen. Pemberton back to Holly Springs. The main body of Grant's army moved forward, and Pemberton, abandoning Holly Springs, fell back to Grenada, Grant following to Oxford, 30 miles beyond Holly Springs. There he arrived 5 December, and arranged with Gen. Sherman a combined movement on Vicksburg. Grant was to move directly south on the line of the railroad and take the place in rear; Sherman to move a force from Memphis, accompanied by a gunboat fleet, to descend the Mississippi and attack in front. A depot of supplies was established at Holly Springs, guarded by Col. Murphy, with two regiments of Wisconsin infantry and a regiment of Illinois cavalry, and Grant was about to move forward from Oxford, when Gen. Earl Van Dorn, at the head of 3,500 cavalry, dashed into Holly Springs at daylight, 20 December, and attacked Murphy, who had been warned of the impending danger on the 19th, but neglected to take the necessary precautions and was surprised. He made a feeble resistance and surrendered his infantry; the cavalry cut its way out and escaped with the loss of only seven men. Van Dorn took about 1,500 prisoners, destroyed stores to the value of \$1,500,000, and left town in the afternoon. This disaster, in connection with Forrest's raid into West Tennessee, which destroyed Grant's communication, forced him to abandon his movement on Vicksburg and fall back to Grand Junction, leaving Pemberton at liberty to concentrate his forces at Vicksburg against Sherman. Sherman was informed of Grant's failure, but the information reached him after his bloody repulse at Chickasaw Bluff, 27-28 Dec. 1862. Consult: 'Official Records,' Vol. XVII.; Greene, 'The Mississippi.'

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Hollyhock, a tall and rather coarse flowering plant (*Althæa rosea*) of the mallow family, said to be a native of China, but now cultivated all over the world as an ornament of old-fashioned gardens. It rises in a single leafy stalk, sometimes to the height of six or eight feet, studded with large single or double flowers, in varieties from white to yellow, scarlet and purple. Although rather difficult to start and slow of growth, it remains a hardy and easily nurtured perennial of highly effective beauty when suitably placed.

Holm, Saxe, a pseudonym affixed to a collection of 'Stories' (1st series 1874; 2d 1878), originally published in 'Scribner's Monthly' and generally believed to be by Helen Hunt Jackson (q.v.).

Holman, hōl'man, William Steele, American politician: b. Veraestau, Dearborn County, Ind., 6 Sept. 1822; d. Washington, D. C., 22 April 1897. He studied at Franklin College (Ind.), was admitted to the bar, and began practice at Aurora, Ind. In 1847-9 he was prosecuting attorney, in 1850 a member of the State Constitutional convention, in 1851-2 of the State legislature. He was a judge of the court of common pleas in 1853-6, in 1856 was elected as a Democratic representative to Con-

gress, where with the exception of eight years, he served until his death. His vigilance in opposing unnecessary appropriations and doubtful measures obtained for him the sobriquets of "The Watchdog of the Treasury," and "The Great Objector."

Holman-Hunt, William. See HUNT, WILLIAM HOLMAN.

Holmes, Abiel, American Unitarian clergyman and annalist: b. Woodstock, Conn., 24 Dec. 1763; d. Cambridge, Mass., 4 June 1837. He was graduated at Yale College in 1783, and became subsequently a tutor in the college, pursuing at the same time his theological studies. In 1785 he was settled over a parish at Midway, Ga., where he remained till 1791. Returning north he became pastor of the first parish in Cambridge, and continued to fill the office till 26 Sept. 1832. Besides publishing a 'Life of President Stiles' in 1798, he was the author also of 'Annals of America' (1805), which gave him a high reputation for care and accuracy. It was republished in England in 1813. He contributed frequently to the collections of the Massachusetts Historical Society, in Vol. XXVII. of which will be found a complete list of his publications.

Holmés, ò-mès', Augusta Mary Anne, French composer: b. Paris 1847; d. there Jan. 1903. She studied composition with Lambert, Klose, and César Franck, and began her career as a pianist. Her first work of magnitude was a setting of the psalm 'In Exitu,' sung for the first time in 1873. She later wrote considerable music, including 100 songs, characterized by much grace of expression. In the larger forms her compositions include the well-known symphony 'Hero et Léandre'; three other symphonies, 'Lutèce,' which in 1879 won third prize in an open competition directed by the Paris municipality. 'Les Argonautes' and 'Irlande'; the symphonic poems, 'Les Sept Ivresses,' 'Roland,' 'Pologne,' 'Au Pays Bleu'; an ode of triumph, 'Patrie'; a four-act lyric opera, 'Le Montagne Noire' (Grand Opera 1895), and an allegorical cantata, 'La Vision de la Reine.'

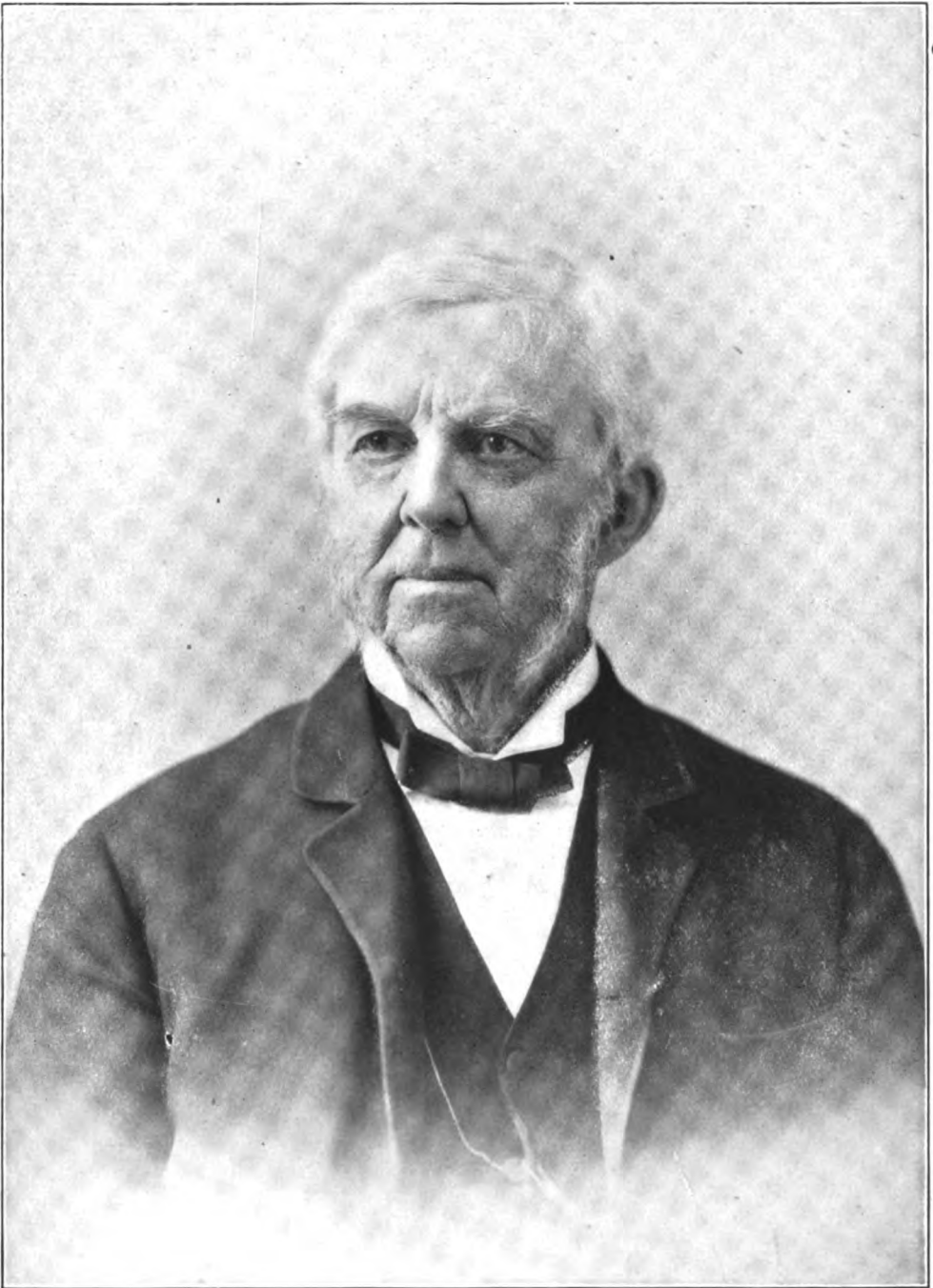
Holmes, Burton, American traveler and lecturer: b. Chicago 8 Jan. 1870. After a secondary education at Chicago he traveled in all the countries of continental Europe, as well as in Japan, Algeria, Tunis, Morocco, Corsica, Greece, and Thessaly, Hawaiian Islands, the Yellowstone Park, the Grand Cañon of the Colorado, the Philippines, and China. About 1890 he became known as a platform lecturer, giving in popular form the results of his observations.

Holmes, Mary Jane Hawes, American novelist: b. Brookfield, Mass.; d. Brockport, N. Y., 7 Oct. 1907. She was married to Daniel Holmes, a lawyer of Brockport, N. Y. She published many volumes of domestic fiction which have had an extraordinarily wide circulation but in which the literary element is slight. Among her novels are: 'Tempest and Sunshine' (1854) (perhaps the best known of them all); 'Lena Rivers' (1856); 'Marian Gray' (1863); 'Milbank' (1871); 'Queenie Hether-ton' (1883).

Holmes, Nathaniel, American jurist and Shakespearian scholar: b. Peterboro, N. H., 2

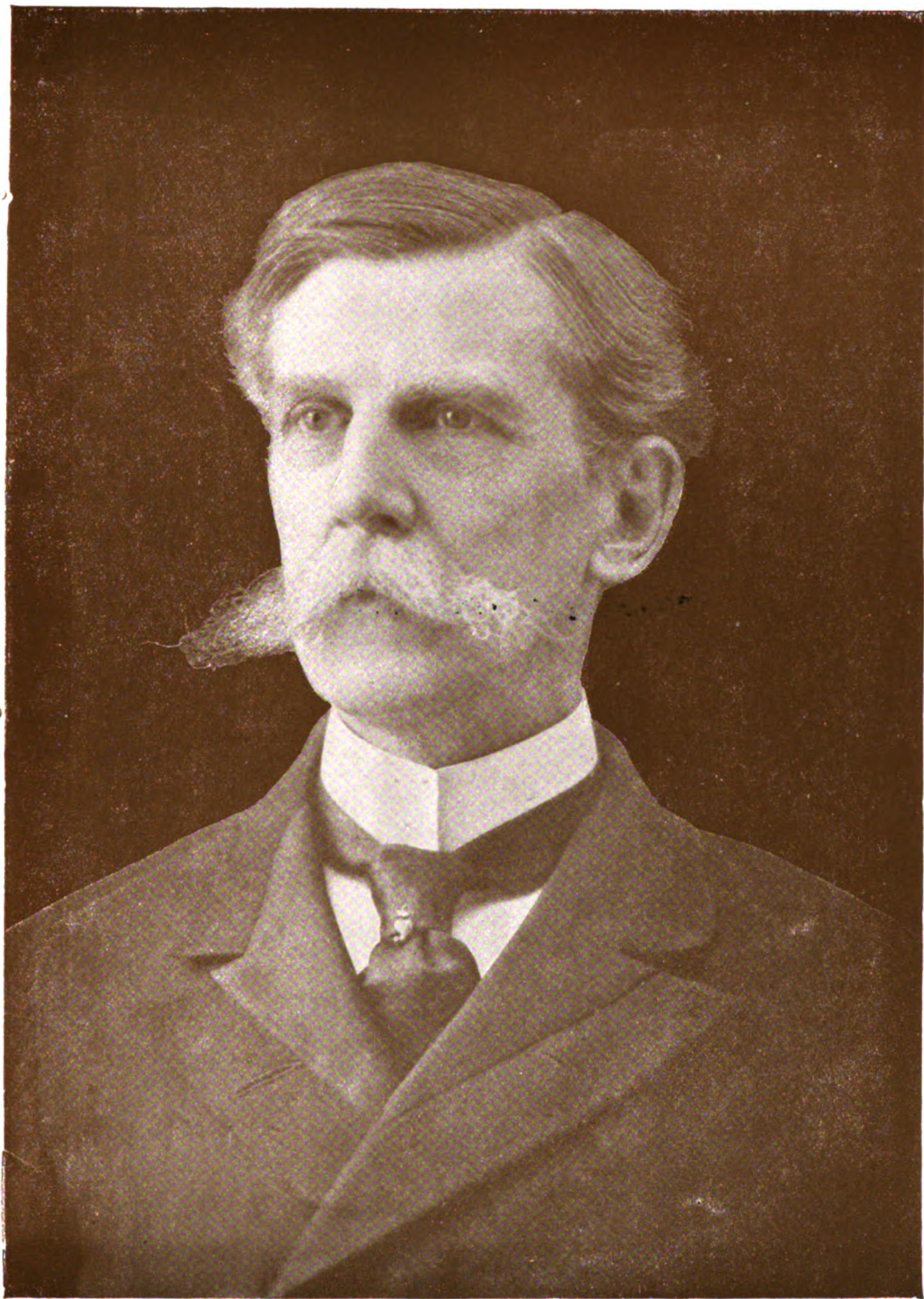
Jan. 1815; d. Cambridge, Mass., 26 Feb. 1901. He was graduated from Harvard in 1837 and after admission to the bar in 1839 began to practise in St. Louis. He was judge of the supreme court of Missouri 1865-9, and Royall professor of law at Harvard 1868-72. He retired from his profession in 1883 and henceforth devoted himself to study and authorship. He was a strong believer in the Baconian theory of the origin of Shakespeare's plays, which he defends in his work, 'The Authorship of Shakespeare' (1866). In 1888 he published 'Realistic Idealism in Philosophy Itself.'

Holmes, Oliver Wendell, American poet, essayist and physician: b. Cambridge, Mass., 29 Aug. 1809; d. Boston, Mass., 8 Oct. 1894. He was the son of Rev. Abiel Holmes (q.v.), minister of the first parish in Cambridge, and on the maternal side was a descendant of Anne Bradstreet (q.v.) and related to the orator Wendell Phillips, the poet Richard Henry Dana, and the theologian, Dr. Channing. He was educated at Phillips Academy, Andover, and at Harvard, and was graduated from the latter in 1829 in a class which contained several who afterward became famous. In the next year he became well known through his poem 'Old Ironsides,' first published in the Boston *Advertiser*, and which prevented the breaking up of the famous frigate Constitution. He spent a year in the Harvard Law School but soon turned his attention to medicine and after studying in Paris three years returned to America where he received his degree of M.D. in 1836, the same year in which his first volume of poems appeared. He was professor of anatomy and physiology at Dartmouth College 1839-40. He married in the last named year and established a practice in Boston, becoming in 1847 professor of anatomy and physiology in the Harvard Medical School, a post which he resigned in 1882, when he was at once made professor emeritus. In 1849, and for several succeeding years, he made his summer home at Pittsfield, Mass., the scene of his novel 'Elsie Venner.' He was one of the first contributors to the 'Atlantic Monthly' when it was established in 1857, the opening chapter of his 'Autocrat of the Breakfast Table' appearing in the first issue. It is this work, which has found innumerable readers both at home and abroad, by which he will be longest remembered. These brilliant, conversational papers were followed in 1859 by a similar series, 'The Professor at the Breakfast Table,' and these in 1872, by 'The Poet at the Breakfast Table.' Many of his best poems were scattered through these volumes. In 1861 appeared his novel 'Elsie Venner: a Romance of Destiny,' and in 1868 'The Guardian Angel,' a less striking fiction than its predecessor, but like that exhibiting a remarkable series of studies of character. 'A Mortal Antipathy' (1885) was his only other essay in fiction. His volumes of verse 'Urania' (1846), and 'Astrea' (1850), had made him well known as a poet ere he appeared before the public as the kindly breakfast table autocrat, and he continued to write poetry at frequent intervals for the rest of his life. He was especially happy as the poet of occasions, but much of his verse, witty and sparkling as it is, is ephemeral from its very nature and not destined to endure. In such serious poems,



OLIVER WENDELL HOLMES.

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OLIVER WENDELL HOLMES,
ASSOCIATE JUSTICE OF THE UNITED STATES.

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HOLMES

however, as: 'The Chambered Nautilus'; 'The Voiceless'; 'The Last Leaf'; 'The Iron Gate'; and one or two hymns, he takes high rank among the poets of his time, while such poems as 'The One Hoss Shay'; 'Evening, By a Tailor,' and 'Parson Turell's Legacy,' to name no others, are inimitable examples of humorous verse. His later collections of poems comprise: 'Songs in Many Keys' (1861); 'Songs of Many Seasons' (1875); 'The Iron Gate' (1880); and 'Before the Curfew' (1887). As a physician and medical lecturer he was very successful, and among his purely professional works may be named: 'Lectures on Homeopathy and Its Kindred Delusions' (1842); 'Currents and Counter Currents in Medical Science' (1861); 'Border Lines in some Provinces of Medical Science' (1862); 'Medical Essays,' a reissue of some of his earlier work (1883). Still other volumes by Dr. Holmes are: 'Soundings from the Atlantic' (1864), a series of essays originally contributed to the 'Atlantic Monthly,' where the bulk of his writing first appeared; 'Mechanism in Thought and Morals' (1871); lives of 'John Lothrop Motley' (1879); and 'Ralph Waldo Emerson' (1884); 'Our Hundred Days in Europe' (1888); a sprightly record of a short visit to England in 1886, on which occasion honorary degrees were conferred upon him by the universities of Cambridge, Oxford and Edinburgh; and 'Over the Teacups' (1891). His 70th birthday was celebrated by a breakfast given in his honor by the publishers of the 'Atlantic Monthly,' and on this occasion the poet read his poem 'The Iron Gate,' which many persons have considered even finer than 'The Chambered Nautilus' which Holmes himself preferred to any other verses of his. At its best Holmes's prose style is thoroughly admirable, characterized as it is by an unerring sense of the value of words and their fitness for conveying a desired impression, and illumined by the interfused play of a delicate fancy and the most sparkling humor. Next to 'The Autocrat' must be ranked 'The Guardian Angel' among his prose works, the same kindly tolerant spirit being dominant in both, and the same shrewd, wholesome perception of character. In much of his earlier poetry, excepting in his lyrics, Holmes uses the formal ten-syllabled iambic pentameter of the 18th century, but in his hands the measure seems at times more flexible than when used by Pope and his school, and it is at all events relieved from solemnity by his ever present humor. 'Urania' is the best-known of his earlier efforts in this manner, and 'The Schoolboy' (1878) his most notable later one, this latter having been written for the centennial anniversary of Phillips Academy at Andover. Holmes's special characteristic was kindness, which found its expression as well in his verse as in his prose, and in his ordinary living. He could be keenly satirical on occasion but he never became in the least cynical. Perhaps no American writer, not even Longfellow or Lowell, ever won the English heart so completely as Holmes. Longfellow found a wide hearing in England for his poetry, it is true, and Lowell was thoroughly appreciated by the upper class Englishman of his time, but Holmes was the most generally beloved of the three. In his own country Holmes's gentle, tolerant writing did

not a little toward softening the asperities of controversy and liberalizing unconsciously the heart of Puritan New England. Consult: Morse, 'Life and Letters of Oliver Wendell Holmes' (1896); and lives by Kennedy (1883); E. E. Brown (1884).

Holmes, Oliver Wendell, Jr., American jurist: b. Boston 8 March 1841. He was graduated from Harvard in 1861, and in the same year entered the army as lieutenant of the 20th Massachusetts regiment. He was wounded at the battles of Ball's Bluff, Antietam, and the second battle of Fredericksburg, and was mustered out of the army in 1864, with the rank of brevet lieutenant-colonel. He then studied at the Harvard Law School, and was admitted to the bar in 1866, beginning his practice in Boston. He was editor of the 'American Law Review' (1870-3); became professor at the Harvard Law School in 1882, and in the same year justice in the Massachusetts supreme court; in 1899 he was appointed chief justice of the same court. His decisions in this position gave him wide fame among lawyers, and were characterized by originality and literary finish. In several cases his decisions were in favor of organized labor; his position being that workmen had a right to combine and to "support their interests by arguments, persuasion, and the bestowal or refusal of those advantages which they otherwise lawfully control, so long as they do no violence or threaten no violence." In August 1902, he was appointed a member of the United States Supreme Court. He has published: 'The Common Law' (1881), lectures delivered before the Lowell Institute; and a collection of speeches (1900); he also edited the 12th edition of Kent's 'Commentaries' (1873).

Holmes, Theophilus Hunter, American soldier: b. Sampson County, N. C., 1804; d. near Fayetteville, N. C., 21 June 1880. He was graduated from the United States Military Academy in 1829, served in the Florida war, the occupation of Texas, and the Mexican War, and at the beginning of the Civil War was major and superintendent of the general recruiting service. On 22 April 1861, he resigned his commission in the United States army, forthwith was appointed brigadier-general in the Confederate forces, and organized several North Carolina regiments. He was in command at Aquia Creek, and, promoted major-general, was in command of the trans-Mississippi department from September 1862 to March 1863, was commissioned lieutenant-general, and 3 July 1863 lost heavily in an unsuccessful attack on Helena, Ark.

Holmes, William Henry, American geologist: b. Harrison County, Ohio, 1 Dec. 1846. He was graduated at the McNeely Normal College in 1870, in 1872 was made an assistant on the United States geological survey, and in 1880-9 was a geologist on the survey. In 1889-98 he was archaeologist to the United States bureau of ethnology, directing explorations, and in 1894-8 also curator of anthropology in the Field Columbian Museum of Chicago, and professor of anthropic geology in Chicago University. In 1898 he was appointed head curator in the department of anthropology in the United States National Museum. His chief works are: 'Archæological Studies among the Cities of Mexico'

HOLOCAINE—HOLSTON

(1895); and 'Stone Implements of the Potomac-Chesapeake Tidewater Province' (1897).

Holocaine. See COCAINE.

Holocephali, hōl-ō-sēf'a-li, or **Chimaeroidae**, a group of small shark-like fishes of bizarre appearance occurring in the deeper portions of all colder seas, including in all about seven species, five in American waters. They have a cartilaginous skeleton, are of no value as food, and are known to fishermen as rat-fish and elephant-fish (q.v.). The name *Chimæra*, given to one genus, emphasizes the strange appearance of these fishes. See ICHTHYOLOGY.

Holophytes, hō'fō-fits. See FUNGI.

Holostei, hō-lōs'tē-i, a group of fishes, the bony ganoids, largely fossil, represented by the garpikes. See ICHTHYOLOGY.

Holothuria, hōl-ō-thū'ri-a, echinoderms of the class *Holothuroidea*, popularly called "sea-cucumbers," from their resemblance in shape and rough skin to that vegetable, in which the body is long, cylindrical, somewhat worm-like, less radiated than other echinoderms with a thick muscular body-wall of longitudinal and transverse muscles. The skin is usually thick, tough, and imbedded in it are in certain forms calcareous plates, wheels and anchors. The mouth is surrounded with a circle of ten branched tentacles, adapted both for respiration and for seizing the food, which consists mainly of foraminifera. The intestine is very long and slender, thus in *Thyone briareus*, which lives in mud and sand on the coast south of Cape Cod, the intestine in an individual three or four inches long is nearly seven feet in length; it opens at the end of the body, and connects with the "respiratory tree," by which the water is introduced into the interior of the body. Unlike other echinoderms the so-called madreporic body is internal. Holothurians move by tubes or ambulacra feet which are filled with water, and when distended act as suckers to drag the animal over the bottom. These suckers are either arranged in five rows or with three rows on the ventral surface, and two above, the latter in some form obsolete, or they are scattered irregularly over the surface of the body, while in *Caudina arenata* of the New England coast there are no suckers. A tendency to bilateral symmetry is seen in a form like *Psolus*, which has a creeping disk and three rows of suckers on the flattened disk-like under side.

The holothurians undergo a metamorphosis, somewhat like that of the starfish; but the transparent larva called "auricularia," is barrel-shaped; what corresponds to the hoops of the barrel being bands of cilia, while the ear-like projections in certain forms give it the name auricularia. Before the larva is fully grown, the body of the young holothurian begins to bud out from near the side of the larval stomach, the calcareous cross-like plates are deposited, and the tentacles begin to grow out. Finally after the larval body is absorbed the young holothurian sinks to the bottom. The degree of metamorphosis is less marked than in other echinoderms, while in two forms development is direct, the young growing in a marsupium or brood-pouch. A form (*Cladodactyla crocea*) living in the south seas at the Falkland Islands, carries its young in a sort of nursery where they

are densely packed in two continuous fringes adhering to the dorsal tubes. Holothurians are remarkable from the fact that when captured they eject their intestine, a new one in time being regenerated. The large forms lying about on the coral reefs are known to harbor a small slender fish (*Fieraster*) which lodges in their cloaca or in the branchial tree. Many of the species are very large, being nearly two feet in length. A common species on the Florida keys and reefs is *Holothuria floridana*; it lives in water only a few inches deep and can be picked up in large numbers; it is fully 15 inches in length, and lives on foraminifera. It has been collected, dried and a shipload exported to China, but the trepang or beche-de-mer of commerce is either of two species (*H. edulis*, and *H. tremula*) inhabiting the Pacific Ocean (see TREPANG). A California species is also dried and exported by the local Chinese.

The class of *Holothuroidea* is divided into two orders: (1) *Actinopoda* represented by *Holothuria*, *Cucumaria*, *Thyone*, *Psolus*, etc.; and (2) *Paractinopoda*, of which *Synapta* is an example, the common form living in sand at low water on the New England coast being *Leptosynapta girardii*. A few forms inhabit great depths. Remains of holothurians have been found fossil; certain calcareous plates attributed to them occurring in the Carboniferous, Lias, Jura, and Cretaceous strata. Minute calcareous bodies referable to *Synapta*, etc., have been detected in the Paris Eocene limestones.

Holst, hōlst, **Hermann Eduard von**, German-American historian: b. Fellin, Livonia, Russia, 19 June 1841; d. Freiburg, Germany, 20 Jan. 1904. He studied history in Dorpat and Heidelberg and in 1865 traveled through France, Italy, etc. His writings were looked upon with suspicion by the Russian authorities and his further stay in that country becoming unsafe, he removed to the United States in 1866. Here he became American correspondent of the 'Kölnische Zeitung,' and sub-editor of the 'Deutsch-amerikanischer Conversations-Lexicon.' In 1872 he was appointed extraordinary professor of history in the University of Strasbourg and in 1874 ordinary professor at Freiburg-im-Breisgau. In 1876 he undertook, with means furnished by the Baden government, a journey to London for the purpose of study and in 1878-9 a similar journey to North America at the expense of the Prussian Academy of Science. In 1892 he accepted an appointment in the University of Chicago. He has published: 'Constitutional and Political History of the United States' (1873); 'The French Revolution Tested by Mirabeau's Career' (1894), etc.

Holstein, hōl'stīn, Germany, a former duchy of Denmark, and member of the Germanic Confederation, since 1866 united to Schleswig-Holstein (q.v.), Prussia.

Holstein Cattle. See DAIRY CATTLE.

Holston, hōl'stōn, a river which rises in the southwestern part of Virginia, flows south and southwest into Tennessee and unites with the French Broad River about five miles east of Knoxville. The Holston and the French Broad are the head-streams of the Tennessee River. The course of the Holston is through a mountainous country, noted for its beautiful scenery.

HOLT—HOLY GHOST

It has as tributaries many small mountain streams. Its length is about 200 miles.

Holt, Joseph, American jurist: b. Breckinridge County, Ky., 6 Jan. 1807; d. Washington, D. C., 1 Aug. 1884. He began legal practice at Elizabethtown in 1828, and in 1857 was appointed commissioner of patents. In 1859 he became postmaster-general and in 1860 secretary of war. He was made by Lincoln a judge-advocate general of the army, with colonel's rank, was promoted brigadier, brevetted major-general for distinguished service in the bureau of military justice, and was retired in 1875. With the exception of Cass, he was the only member of Buchanan's cabinet that was not a Confederate sympathizer. Among the courts over which he presided were those before which Fitz-John Porter and Lincoln's assassins were tried.

Hol'ton, Kan., city, county-seat of Jackson County; on the Missouri P., the Chicago, R. I. & P., and the Union P. R.R.'s; about 28 miles north of Topeka and 30 miles west of Atchison. It was settled in 1859 and received its charter in 1870. It is situated in a section noted for good farms. The chief manufactures are flour, wagons, cigars, creamery products, and planed lumber. Its trade is chiefly in wheat, corn, hay, live-stock, and local manufactured products. The government is vested in a mayor, who holds office two years, and a common council. Pop. (1910) 2,842.

Hölty, Ludwig Heinrich Christoph, lood'-vīg hīn'rih krēs'tōf hēl'tī, German lyric poet: b. Mariensee, near Hanover, 21 Dec. 1748; d. Hanover 1 Sept. 1776. In 1769 he went to Göttingen to study theology. Here, falling in with Bürger, Voss, the Stolbergs, and other poets of kindred tastes, he became one of the founders of the Göttingen "Hainbund." This league of young enthusiasts was aflame for Klopstock, then considered the greatest German poet for patriotism and for friendship, detested Wieland's sensual poems and his Frenchified manner, read the classics together, and wrote poetry in friendly emulation. Hölty's poems reveal a lovable personality. The strain of sentimentality that runs through all his work is not affectation, as it was with so many of the younger poets of that age in which Rousseau had made sentimentality fashionable, but the true expression of his nature. His range was small; but within its limits his work was excellent, and many of his songs have become the common property of the people. Consult: Voigts, 'Hölty, ein Roman' (1844); Reute, 'Hölty, Sein Leben und Dichten' (1883).

Holub, ho'loob, Emil, Austrian explorer: b. Holics, Bohemia, 7 Oct. 1847; d. Vienna 21 Feb. 1902. At 25 he went to South Africa, where he practised in Kimberley and elsewhere as a physician. Later he became engaged in African exploration and in recognition of his services as an explorer received from the Austrian emperor the Order of the Iron Crown. He published 'Beiträge zur Ornithologie Südafrikas'; 'Sieben Jahre in Südafrika' (1881); 'The Colonization of Africa'; and 'From Cape Town to the Maskukulumbé.'

Holy Alliance, an international league proposed by Alexander I., emperor of Russia, 26 Sept. 1815, after the defeat of Napoleon at Waterloo had cleared the way for the execution

of his desire of establishing a settled peace in Europe. Alexander, Francis of Austria, and Frederick William III. of Prussia, signed with their own hands, and without the countersign of a minister, the act establishing this alliance, which is said to have been sent to the two latter in the handwriting of the first. It was not wholly published till 2 Feb. 1816, when the text was given in full in the *Frankfort Journal*. It consisted of a declaration, that, in accordance with the precepts of the gospel of Jesus Christ, the principles of justice, charity, and peace should be the basis of their internal administration, and of their international relations, and that the happiness and religious welfare of their subjects should be their great object. Its real aim, however, was to maintain the power and influence of the existing dynasties. It was also stipulated that the three sovereigns should invite others to become members of the Holy Alliance. In Russia and Germany its principles were not discussed except in a spirit of eulogy, but they were uncompromisingly condemned in Britain by many of her foremost statesmen. On 4 Feb. 1823 both Lansdowne and Brougham openly condemned its doctrines in their places in Parliament. Sir James Mackintosh said of the doctrine of legitimacy, in the sense in which it was used by the Holy Alliance, "Sophistry lent her colors to the most extravagant pretensions of tyranny." The events of 1848 broke up the Holy Alliance. It had previously lost much of its authority from the death of Alexander, and the French revolution of 1830. By a special article of the treaty the members of the Bonaparte family were declared incapable of occupying any European throne.

Holy Cross, College of the, an institution in charge of the Fathers of the Society of Jesus, situated at Worcester, Mass. The school was founded in 1843. It has a preparatory department; and the college grants the usual degrees given by classical and scientific institutions. It is self-supporting; up to 1910 it had received no State aid nor any endowments. It has established six fellowships. In 1910 there were connected with the school 30 professors and instructors, and nearly 515 students. The library contained about 36,000 volumes.

Holy Cross, Mount of the, a peak of the Rocky Mountains, in Eagle County, in the State of Colorado. The peak is about 75 miles southwest of Denver, and 20 miles north by west of Leadville. It is 14,006 feet high.

Holy Day, a day set apart in the Catholic Church for the commemoration of some saint or mystery. It is called "of obligation" when attendance at Mass and abstention from servile works are prescribed.

Holy Ghost, or Holy Spirit, the third person in the Holy Trinity. The Roman Catholic Church declares the Son to be begotten by the Father, and the Holy Ghost to have proceeded from both. The Orthodox Greek Church maintains that the Holy Ghost proceeds from the Father only; and this is one of the main points of doctrine on which Roman and Greek Catholics differ. The history of the controversy is shortly this: Tertullian and Origen, two distinguished Fathers of the Church in the 3d century, maintained that the Holy Ghost was begotten by the Father through the Son.

HOLY GHOST FLOWER—HOLY WEEK

Macedonius, bishop of Constantinople in the middle of the 4th century, denied that the Holy Ghost was equal in essence and dignity to God the Father. The Council of Alexandria in 362 declared this bishop and his adherents, the Pneumatomachists, teachers of heresy; and the general council at Constantinople in 381 declared expressly to the whole Christian Church, that the Holy Ghost was the third person of the Trinity, proceeding from the Father, and to be worshipped equally with the Father and the Son. Augustine taught that the Holy Ghost proceeds from the Father and the Son; and the Council of Toledo, in 589, condemned all who believed otherwise. This new formulation of the dogma occasioned a controversy which lasted from the 8th to the 11th century, between the Western or Latin, and the Eastern or Greek Churches, and finally led to their complete separation. The Anglican Church and the Protestant Episcopal Church in the United States use the Greek form of the Nicene Creed. The worship of the Holy Ghost as the third person in the Godhead is common to both Roman and Greek churches, and to the Protestant Trinitarians, being essential to the faith in the divine Trinity. See CREED: TRINITY.

Holy Ghost Flower, or Holy Spirit Plant. See DOVE PLANT.

Holy Ghost, Order of, a former order of Hospitalers, founded by Guy, son of William, Count of Montpellier, in the 12th century, for the relief of the poor, the infirm and foundlings. In the 18th century it was united with the order of St. Lazarus by Clement XIII. Also the name of the principal military order in France instituted in 1578, abolished in 1789, revived at the Restoration, and finally abolished in 1830.

Holy Land, a name given by Mohammedans to Arabia because it was the birthplace of Mohammed; also by Buddhists to India because it was the country of Sakya Muni. It is a common name of Palestine, because the place where Christ lived when upon earth. See PALESTINE.

Holy Orders, the several ranks of the ministry of a church; also the power or authority to exercise that ministry.

In the Roman Catholic Church Holy Orders is one of the sacraments and there are seven orders of the ministry, viz.: priesthood, deaconate, and sub-deaconate: these are the greater or sacred orders; and the four minor orders of lector, acolyte, exorcist, and doorkeeper. Usually the episcopate is classed, not as a separate order, but as the completion and extension of the priesthood. Though every candidate for the priesthood is inducted into the four minor orders and the sub-deaconate and deaconate before he receives priestly ordination, it happens very seldom that a man enters any of those inferior orders intending to remain therein: they are simply steps to the priesthood.

In the Oriental churches, both those in communion with the Roman See—as the Greek Uniate, the Maronite, the United Armenian, etc., and those which are separated from Rome by schism or by heresy, the number of orders is less than in the Latin Church: in all the foregoing churches only four orders, or, counting the episcopate as a distinct order, five orders are recognized; those of bishop, priest, deacon, and lector: and of these the first three, at least,

are held to be of divine institution and sacramental.

By the Anglican Church and the Protestant Episcopal Church of the United States three orders are recognized; those of bishops, priests and deacons: but in the 25th of the Articles of Religion those orders are expressly declared to be no sacrament.

The orders of the Oriental churches are generally recognized as valid by the Church of Rome; and when a priest of any of those churches is received into the Roman Catholic Church he is still regarded as a priest: but an Anglican or a Protestant Episcopal minister enters the Latin Church as a simple layman even though he were in Anglicanism a bishop; for Anglican orders have ever been held by Rome to be invalid.

Other Protestant churches, whether episcopal (as the Lutheran) or presbyterial or congregational, do not regard holy orders (or clerical order) as of divine institution or as setting up any essential difference between minister and layman. See CLERGY.

Holy Roman or German-Roman Empire, a title conferred on the German empire in 962 by Pope John XII. at the coronation in Rome of Otho I., who considered himself the lineal representative of the rulers of the ancient Roman Empire which practically had ceased to exist in 476. The designation ended in 1804 with the accession of Francis II. as hereditary emperor of Austria. See HAPSBURG.

Holy Water, in the Greek and Roman Catholic Churches, water which has been consecrated by prayers, exorcism, and other ceremonies to sprinkle the faithful and things used for the church. Some antiquaries think that the use of holy or lustral water was borrowed from the Jews. The Roman Catholic Church considers holy water not only symbolical of the purity of the soul, but in certain cases as effectual in exorcism. At the entrance of all churches is kept a font of holy water, in which those going in and out dip the fingers and bless themselves. The consecration of holy water takes place on Holy Saturday before Easter Sunday.

Holy Week, or **Passion Week**, is that which immediately precedes Easter. The name Passion Week rather refers to the days following and exclusive of Palm Sunday, since this day, strictly speaking, does not commemorate any incident of Christ's passion, but his triumphant entry into Jerusalem. The three chief days of the week are Maundy Thursday (or Holy Thursday), Good Friday, and Holy Saturday, the most sacred of all being Good Friday. The observance of Holy Week is of very early origin, and it was known as Great Week, Silent Week, Penitential Week, etc. In the ancient Church of Rome, when any of the ordinary Church festivals falls on this week, it is not observed till after Easter. In Rome it used to be observed with much greater solemnity and penitential rigor than now; for the shops are kept open, concerts and other amusements are given, though the theatres are closed. The washing of the feet of poor men is still practised in Roman Catholic churches; and the pope washes the feet of 13 poor persons, all of whom are priests. In Austria the emperor keeps up the old rite of feet-washing with much ceremony.

HOLYOAKE—HOME EDUCATION

Holyoke, hōl'ŏk, **George Jacob**, English political reformer: b. Birmingham 13 April 1817; d. Brighton 22 Jan. 1906. He early became connected with various advance movements in Birmingham. In 1841 he was one of the lecturers chosen to explain Robert Owen's social theories, and next year was imprisoned on a charge of atheism. He supported the Chartist demands, but did not sympathize with their hostility to the Whigs. He took an important part in the agitation for the repeal of the corn laws, and for the repeal of the so-called "taxes upon knowledge." He was the founder of a purely ethical religion, without theistic element (secularism); and was active as a lecturer and writer in the co-operative movement. His works include: 'The Logic of Death'; 'The Logic of Life'; 'The Trial of Theism'; 'Nature and the Origin of Secularism'; 'Thirty-three Years of Co-operation' (1872); 'History of Co-operation in England, Its Literature and Its Advocates' (1875); 'Among the Americans' (1881); 'Self Help One Hundred Years Ago' (1888); 'The Co-operative Movement of Today' (1891), a short, useful account of the history of co-operation; 'Sixty Years of an Agitator's Life' (1892), an autobiography; and 'Jubilee History of the Leeds Co-operative Society' (1897).

Holyoke, hōl'yōk, Mass., city in Hampden County; on the Connecticut River, and the New York, N. H. & H. and the Boston & M. R.R.'s; about 75 miles southwest of Boston and 8 miles north of Springfield. Holyoke was settled in the last part of the 17th century by people from Ireland, and for some time it was called Ireland Parish. It was incorporated as a part of West Springfield in 1786; but in 1850 it became a distinct town, with its own government, and it was chartered as a city in 1873. Like the other settlements along the shore of the Connecticut, the inhabitants saw the advantages to be derived from the water-power. At first only the small streams flowing into the Connecticut were dammed, and used for turning machinery; the main stream itself was the great route whereby trade intercourse was established with settlements along its shores. In 1847 the Hadley Falls Company began to devise ways and means of using the water-power of the Connecticut River, which at Holyoke had a fall of about 60 feet. In a few years the dam, 1,000 feet in length, was placed across the river, and the water-power thus obtained gave Holyoke great opportunities for the establishment of manufacturing industries, and they have been well utilized. For some years it was noted for the number and magnitude of its paper-mills; but other industries now enrich the city. Its chief manufactures are paper, paper-products, thread, cotton and woolen goods, knit goods, alpaca, silk, automobiles, machinery, bicycles, wire, belting, screws, bricks, furniture, and school supplies. Some of the public institutions are the College of Music, public library, House of Providence hospital, city hospital, two orphanages located outside the city limits, St. Vincent's for girls and Holy Family for boys. A large percentage of the people are of foreign birth or foreign descent. The school census of 1902 shows the following: Public schools, 3,500 Irish, 3,200 French, 800 German, and 900

American. In the parish schools there were enrolled that same year 3,500 pupils. The law which declares: "No minor who cannot read and write the English language can be employed in any factory or commercial enterprise" is rigidly enforced. Evening schools are provided for those who cannot attend school in the day time. The Holyoke Scientific Society has done special and excellent work in American archæology. It owns a valuable collection of Indian relics. Some of the places of interest near the city, and which may be reached by the electric railway, are Mount Holyoke (q.v.), Mount Tom (q.v.), and Springfield. In 1896 the city charter was revised, and the government is now vested in a mayor, who is elected annually, and a city council. Pop. (1910) 57,730.

Holyoke College, Mount. See MOUNT HOLYOKE COLLEGE.

Holyoke, Mount, a narrow ridge of greenstone, the highest point of which is about 1,120 feet above the sea. It is in Hampshire County, Mass., about one mile east of the Connecticut River, five miles southeast of Northampton, and eight miles northeast of Holyoke. On the summit is a hotel, built in 1821. The hotel can be reached by a carriage road which winds to the top, or by a railway which runs up a steep incline.

Holyrood, hō'lī-rood, **Palace and Abbey** of, Scotland, the ancient royal residence at Edinburgh (q.v.).

Homatropin, hō-măt'rō-pīn. See ATROPINE.

Home, **Henry**, LORD KAMES, Scottish lawyer and author: b. Kames, Berwickshire, 1696; d. Edinburgh 27 Dec. 1782. He studied law at Edinburgh, and, called to the bar in 1724, soon acquired reputation by a number of publications on the civil and Scottish law. In 1752 he became a judge of session, and assumed the title of Lord Kames. In addition to legal works he published 'Essays on British Antiquities'; 'Essays on the Principles of Morality and Natural Religion,' in which he advocates the doctrine of philosophical necessity; 'Introduction to the Art of Thinking'; and his best-known work, 'Elements of Criticism,' in which, discarding all arbitrary rules of literary composition, he endeavors to establish a new theory on the principles of human nature. In 1776 he published the 'Gentleman Farmer'; and in 1781 'Loose Thoughts on Education.'

Home Education. From the earliest recorded school the conception of education has steadily broadened, till now careful thinkers recognize that education should be for adults as well as for the young, carried on at home as well as in school and through life instead of for a limited course. The agencies for this broader education are in five distinct groups, and workers in this special field after mature deliberation have given to it the name "Home education" because it differs from school education in being carried on at home while the students are engaged in their regular callings, instead of in schools as a chief occupation. The five groups of schools (elementary schools, high schools and academies, colleges, professional and technical schools, universities) might be called the five majors of education, while libraries, museums, study clubs, extension teaching, tests and credentials might be called the five minors.

HOME EDUCATION

1. *Libraries.*—This includes reference and lending libraries, magazine and news rooms and all reading of the conventional symbols called print. Reading courses, circles, clubs, and home study from books without instructors belong to this library group, which is the cornerstone of all home education. See LIBRARIES; TRAVELING LIBRARIES.

2. *Museums.*—This includes museums and laboratories of science, art, history, etc. As the library group includes education through the eye by means of conventional symbols, so in its broadest sense the museum group represents education also through the eye from reading the interesting and beautiful language of nature and art; and as reading may often have no direct connection with the public library, so also the museum group may include detached monuments, statues, busts, pictures, and other works of art. See MUSEUMS.

3. *Extension Teaching.*—This includes all agencies which extend personal help or teaching to those who cannot attend regular schools; for example, summer, vacation, Saturday, night schools or classes, extension lectures, correspondence teaching, home study under direction, classes in libraries, Y. M. C. A. or Y. W. C. A. and other organizations. Mere lectures or addresses not accompanied by class or paper work, or instruction in the more limited sense, should be sharply distinguished from extension teaching. They represent the platform and perhaps should be counted as an independent group. Some so-called extension teaching is really little more than lectures, while under the name lecture some excellent instruction is given. The group should perhaps be called "extension teaching and lectures," to keep prominent the difference between the two, while it recognizes as their common distinguishing quality the personal aid and inspiration given by the teacher or lecturer to his class or audience. Lecturers give the inspiration and magnetism of personal contact which cannot be transmitted in print. This personal element, however, is chiefly on the side of the lecturer; the audience is a mass. In extension teaching where the lecturers are to stimulate to personal study and are supplemented by class and written work, the personal element is reciprocal; for the teacher, dealing with each student as an individual, answers his questions, solves his difficulties and is his personal teacher, guide and friend. The lecture is chiefly for inspiration; the teaching, for instruction.

The chief factors in extension teaching are:

Summer Schools.—In the last decade skepticism as to the practical value of summer schools has given way to official recognition by the leading American universities of the demand for such instruction and of the duty to supply it of institutions with buildings, libraries, laboratories, reputation and faculty. Fortunately, many weak institutions, some of them started or maintained from commercial motives and others lacking funds for proper work, have been discontinued as one by one the strongest institutions have offered the needed instruction and thrown open to the public during the summer months their great facilities. See SUMMER SCHOOLS.

Correspondence Teaching.—Commercial ex-

periments have proved that there is a large demand for instruction in many subjects, especially those which add most directly to wage-earning capacity, from those wholly unable to leave their positions to attend any of the established schools. The growth of this demand is evidenced by the great number of advertisements of such instruction and by the marked success of some of the more prominent schools. One of these schools in 1903 had 650,000 students and 114 professors, and upward of 2,000,000 persons were taking correspondence courses in this country. The method having been proved efficient is beginning to be adopted by the endowed institutions; and inevitably as they offer better instruction at less cost and with it their established reputation, correspondence teaching with full recognition of its limitations but also of its possibilities, will become an established and creditable educational factor.

Extension Courses.—In America for the few years near the end of the 19th century hundreds of university extension centres were established, most of them with insufficient knowledge of what a real extension course was and with inadequate facilities and teachers inexperienced in this peculiar but important work. The result predicted naturally followed and most of the organizations which sprung into existence died out. The University of Chicago won first place by the excellence of the work it offered and still carries on. The American Society for the Extension of University Teaching in Philadelphia has been most active and successful of all the voluntary organizations. The New York State extension work was from the first announced to be wholly subsidiary to the more important function of the public library and study clubs. Experience has proved the great merit of the extension method in the hands of skilful teachers with a gift for this difficult kind of teaching, where inspiration is more important than instruction. See UNIVERSITY EXTENSION.

Lectures.—In most cases lecturers have been desultory and have been intellectual entertainments rather than entitled to rank as educational factors. Students of home education, however, recognize the inspirational lecture as a strong lever in their work and are using it more carefully and effectively, and organizing into courses which give better results. The Brooklyn Institute has maintained for many years a remarkable system, giving each year hundreds of lectures from recognized authorities, and in connection with its library and museum affords the best existing example of a great metropolitan home education centre. In New York the free lectures for the people have grown steadily from year to year and exert a great influence for good on the hundreds of thousands who hear them annually. Progressive librarians are more and more feeling the responsibility of guiding the local demand so that the lectures shall become a still more efficient ally of the library in its broad work of giving information, inspiration and intellectual recreation. See also ADULT EDUCATION.

4. *Associations or Clubs.*—This includes all forms of mutual help through associated effort, from the club of two friends in a single house to the great summer schools like Chautauqua, where each July and August thousands gather

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from all parts of the country. This work with one's fellows supplies something of the element of residence, which is as valuable a part of the usual college course as are the studies. A certain subtle mental chemistry of the greatest practical value results from contact with other minds pursuing the same studies. If this gives a few weeks actual residence away from home, with daily student life, and a course in such company and surroundings as our best summer schools now offer, the student gets an invaluable taste of real college residence. This mutual help element in home education is chiefly supplied by the numerous literary and study clubs, many of which are coming to give their annual programs, a definite educational value by limiting them to a single worthy subject and supplying members with books, pictures and, if needed, specimens or other aids.

5. *Tests and Credentials.*—The great problem in popularizing education is to secure continuous and systematic study from those lacking the stimulus of the schools. Experience shows that a goal is needed by most people to hold them to completion of what they begin, by giving tests and official recognition, with suitable credentials for work well done. Differing from the other groups their field is to stimulate, test, record, and certify, rather than to give instruction. In spite of the criticisms and abuses of examinations, no satisfactory substitute for the good they accomplish when properly used has yet been found. They are last and least of the minors, but necessary to a complete system.

Educational Factors.—Most well equipped schools have all the factors of home education in active operation, but it is the use of these factors by those who cannot attend schools that constitutes home education. Schools imply residence and are attended consecutively, students advancing stage by stage from kindergarten to university. In home education the student will often use all five minors at once, and in well organized extension courses with lectures, syllabus, class, paper work, directed reading, student club and final examination we have four of the five minors, and in many subjects the museum or laboratory element is also added. A town that aims to provide educational facilities for both old and young at home, through life must make all five groups available. For most places the ideal would be to combine in a single building suitably arranged, the public library, museum, extension, examination, and association or club rooms, thus massing in a single institution, for which the best name is institute, all the essential educational agencies outside regular schools.

While there should be constant co-operation and the utmost harmony between the agencies for home and school education, experience constantly proves that the best results cannot be obtained by putting home education work in charge of school authorities. The obvious reason is that school trustees naturally and properly feel that the school system is the vital part, while libraries, museums, clubs, and extension teaching are only incidentals. The best results are always reached with independent trustees, who regard home education as quite as important as school education, and who devote all their energies to promoting their own

work. While two governing boards are thus a necessity, a larger number is more costly and less efficient in administration, so that most close students of this problem advise in all ordinary circumstances the massing of the five minors together under a single board with headquarters in a single building. While in theory the library is one of the five home education factors, in fact the rapidly growing practice is wisely making home education a part of the library. This is because the country is being rapidly dotted with library buildings supported by taxation and endowments and receiving private gifts and public appropriations and support to a degree never equaled in educational history. The public library is already one of the most popular of American institutions and is rapidly gaining ground in all civilized countries. With buildings, endowments, trustees and public sympathy and support, it is the most economical, natural and best centre for the other elements of home education. In New York the official title now used is "New York State Library and Home Education," but it is frankly stated that the words "home education" will be dropped when the public learns that library means not a mere collection of books, but the home of all this closely allied work.

At the national meeting of American librarians in 1898 the entire program was given to impressing as strongly as possible the fact that small as well as large public libraries had the privilege and duty of giving stimulus and aid not alone to readers of books, but to all citizens, young or old, who were seeking intellectual advancement. Libraries are rapidly introducing the museum element in collecting and lending pictures as they do books. Many have started collections in art, science, or history. Laboratories are sure to follow, where persons without such facilities at home may pursue investigations and supplement their reading with experimental work. Even small towns now consider a library building inadequate which does not provide rooms for literary, scientific and similar societies for mutual improvement, and lecture halls, large and small, for the various phases of extension teaching. In the last few years this development has become less a matter of discussion than the rapidity with which individual libraries may take on their new and broader functions.

MELVIL DEWEY,

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Home Rule, the domestic control of local affairs in a province, colony, or dependency of an empire. The term has been employed in recent history most especially with regard to Ireland, which has been a dependency of England ever since Pope Hadrian, as is averred, handed it over to Henry II. of England in 1155, on condition that a certain portion of its revenue should flow into the treasury of the Holy See. Since that time Ireland has been more or less subject to the government of England. English viceroys have ruled at Dublin, and English troops kept the peace. The Irish are a high-spirited and proud nation, and the history of their subjugation has been a bloody one. For many years, however, they had their own parliament, and managed their own domestic affairs. Then came what was called the Union. The Irish

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parliament was abolished, and Irish boroughs elected representatives to seats at Westminster. This was in 1801, when it is said that the Irish parliament which passed the bill for its own destruction was bribed or cajoled into what Irishmen of to-day consider a fatal and suicidal act. The first Irishman of note to attempt a remedy for Irish grievances was Daniel O'Connell. Catholic emancipation had been won largely through his agitation, seconded by the strong and clear-headed statesmanship of Wellington. In 1834 O'Connell brought forward in the House of Commons his motion for a repeal of the Union. By recent act of Parliament the municipal councils of Ireland had been thrown open to Roman Catholics. O'Connell was elected lord mayor of Dublin, and while his motion for appeal was supported with but 40 votes in parliament, he carried it by 45 to 15 votes in the municipal chamber at Dublin. This was undoubtedly the earliest step in the movement toward home rule, which from that time to the present moment has convulsed Ireland. In the town council at Dublin one of the 15 who had voted against O'Connell's motion for the repeal of the union was a brilliant young lawyer named Isaac Butt. In 1871 he was elected member of Parliament for Limerick and with him the Home Rule party in the English Parliament was born. The party struggled along for many years striving by obstruction and agitation in several quarters to maintain the rights of Ireland, and obtain for her better terms in her relations with the mother country. Mr. Butt, who was a true home ruler, though a conservative, was at length incensed by the obstructionist tactics of Parnell and Biggar, which he thought beneath "the dignity of Parliament," and practically surrendered the leadership of his party, in which he was succeeded by Parnell. In 1877 Parnell was elected president of the Home Rule Confederation of Great Britain. Parnell very quickly showed that he not only had very definite views, but possessed also the courage of his convictions. He became an advocate of peasant proprietorship. For the realization of this idea the Land League was constituted. At a meeting held in London 21 Oct. 1879 it was declared that the objects of the league were, first to bring about a reduction of rack-rents; second to facilitate the obtaining of the ownership of the soil by the occupiers. It was very remarkable to see how English opinion was gradually molded by the great Land League and Home Rule Party. In the elections of 1885 many Conservative candidates almost echoed the words of Parnell in declaring for a "liberal measure of home rule for Ireland." In the elections of 1885 the Liberals came in for a majority and Mr. Gladstone was premier for the third time. He was not long in bringing in a bill providing for "the constitution of an Irish parliament sitting in Dublin with the Queen as its head." He urged the passing of the bill with one of the most powerful, the most effective, and most touching speeches which he ever delivered. But his eloquence was in vain, the measure was defeated by a majority of 30. This was not the last time that Gladstone was to attempt the liberation of Ireland. But bold as had been his change of opinion in putting forth a measure he had in earlier life condemned, his conception of Home Rule for Ireland was quite inadequate

compared with what O'Connell contemplated in his agitation for repeal. Such as it was, Gladstone again staked the existence of his ministry on its realization in 1893. The bill passed the House of Commons, but was rejected in the House of Lords, and since that time Home Rule for Ireland has been a dead issue in English politics.

Home Rule, Municipal. See MUNICIPAL GOVERNMENT.

Homer, hō'mér, a poet to whom was attributed in ancient Greece the authorship of the two epic poems, the 'Iliad' and the 'Odyssey,' which form the foundation of Greek, and consequently of European literature. Of Homer's personality, birth, place, and time, we have no certain knowledge. His very existence has been brought into doubt, and in accordance with the etymology of his name Homer, which means the same as Vyasa, to whom the Mahabharata has been attributed, he is sometimes taken merely for the "arranger" or "compiler" of the works that go by his name. Seven cities, however, contended for the honor of being his birthplace; their names form the hexameter line

Symrna, Rhodes, Colophon, Salamis, Chios, Argos, Athens.

These names cover almost the whole geographical area of Greece and at least point to the extent of the poet's fame and influence. Although the dates of his birth and death are equally doubtful, critics have placed him anywhere in the 9th and 10th centuries before Christ, though some have thought these dates 500 years too early. He is traditionally said to have been blind, like Demodocus, the minstrel of the Odyssey. Some in ancient times attributed to him also the Batrachyomachia, and the so-called Homeric hymns, but it is at least doubtful whether these were written by the author of the 'Iliad,' as the Batrachyomachia seems a century later than the epics, and the hymns to Apollo, Demeter, Hermes, Aphrodite, and minor divinities were probably preludes or introductions which the rhapsodes or minstrels sang or chanted before beginning the serious business of the epic recitation.

The 'Iliad' and 'Odyssey' deal with the war waged by European Greece against Asiatic Troy.

The Iliad.—This 'Poem of Ilium' or Troy describes some phases of the war waged by Agamemnon and his brother Menelaus against Priam, whose son Paris had carried off Helen, the beautiful wife of Menelaus. The subject of this epic is called the wrath of Achilles, the representative Greek hero, a romantic and dazzling figure. He remains in his tent without helping in the war because Agamemnon has taken from him the captive slave girl Briseis. At length Hector, the champion of the Trojans, slays in fight Patroclus, the bosom friend of Achilles, who is roused by this from his sullen inactivity, and rushes forth to the battlefield, where he meets and slays Hector, whose funeral rites form the closing incidents of the poem.

The Odyssey.—The 'Odyssey' describes the return of Odysseus from the siege of Troy to his island kingdom, Ithaca, where he is restored to his faithful wife, Penelope, and takes vengeance on the suitors who have sought her hand and wasted her husband's substance in

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revelry and debauchery during his absence. The first four books describe Odysseus detained in the magic isle of Calypso, and the despatch of his son Telemachus to bring him home. The following eight are taken up with the hero's homeward voyage with his various adventures. In books 13-19, Odysseus in the attire of a beggar is found unrecognized at the door of his home; books 20-24 describe his vengeance on the suitors.

There were some critics of Greece, notably Xenon and Hellanicus, who held that the so-called Homeric epics were written by different men. This school of grammarians were called *chorizontes*, or separators. There is much indeed to give color to such a view. As has been said, the 'Iliad' was written for men, the 'Odyssey' for women. But what principally distinguishes the 'Odyssey' from the 'Iliad' is the fuller and more complete individualization of the Greek divinities, the higher tone of religious and social life. The knowledge of foreign lands and their products and the means of travel by sea seem also to have reached a more advanced stage.

It remained for F. A. Wolf in his famous 'Prolegomena ad Homerum' (1795) to make the keenest and most searching analysis of these epics, as regards their unity of composition and identity of origin. He relies upon the statement in Greek history that Pisistratus in 540 collected and arranged the Homeric poems in something like their present form. The epics are thus made up of separate ballads, sung by rhapsodes, probably written by different poets, and Wolf has shown much acuteness in pointing out that long epic poems could not have been transmitted from such early antiquity without handwriting, which did not then exist, and in indicating what portion of each epic originally formed individual and distinct songs or lays. Consult: Jebb, 'Introduction to Homer' (1887); Monro, 'Homeric Grammar' (1891); Ebeling, 'Lexicon Homericum' (1885); Leaf, 'The Iliad' (1888); Hayman, 'The Odyssey' (1882).

Homer, Winslow, American painter: b. Boston 24 Feb. 1836; d. Scarboro, Me., 29 Sept. 1910. He studied in the National Academy of Design and was also a pupil of Frederic Rondel. He was sent to the front during the Civil War as special artist to *Harper's Weekly* and on his return to New York exhibited his first important work, 'Prisoner from the Front' (1864), which won him recognition. In 1865 he was elected Academician. Taking up his residence in Scarboro, Me., he painted a series of pictures which indicated a marked development in style, sentiment, and power. There was a trace of conventionality at least in the subjects of such pictures as 'Home, Sweet Home,' which he painted between 1864 and 1884. From the latter date he began his portrayal of the fisher population of New England. Dramatic and realistic in the highest degree is the series of seven canvases from the 'Life Line' (1884) to the 'Lookout' (1897). But this artist reached his finest vein in his pure marines, of which the greatest is 'The Maine Coast.'

Homestead, hōm'stēd, Pa., borough, in Allegheny County, on the Monongahela River and on the Pittsburg & L. E. and the Penn-

sylvania R.R.'s; about seven miles south of Pittsburg. It was settled in 1871 and incorporated and chartered in 1880. The chief manufactures are foundry-products, glass, machinery, and steel products. It is noted for its large steel plants, which employ over 6,000 men. The borough owns and operates the waterworks. At one time Andrew Carnegie (q.v.) was the principal owner of the Homestead steel works. Pop. (1910) 18,713.

There occurred in Homestead a serious strike which began 6 July 1892. Reductions in wages, change in time of signing the schedule, and refusal to recognize the Amalgamated Iron and Steel Association, or to hold any conferences with the men, had brought on a general strike to date from a certain time, and enraged the men into burning H. C. Frick, the manager, in effigy; whereupon the works were at once shut down, 1 July, two days ahead of the agreed time, and the men armed themselves and prepared to resist by violence any attempt to supply their places with non-union men. The advisory committee of the union took charge of the town with regular armed companies, and allowed no one to enter the mills without their permission. On 5 July the company announced an intention to make repairs, and appealed to the sheriff for protection; he sent a small squad, who were at once driven from town by the strikers, the latter denying that any damage was intended and offering to be sworn in as deputies themselves. The company then hired a body of 300 Pinkerton detectives, who came up the river in barges; but the strikers broke through the fence surrounding the mill, intrenched themselves behind a barricade of steel rails and billets, and whenever the Pinkerton men attempted to climb the steep bank (which they began at 4 A.M. of 6 July), shot them down. Next day they procured a 10-pounder brass cannon and bombarded the boat, splintering her wooden sides, but failing to pierce the steel plates within. They then sprayed the boats with oil from a hose, and emptied barrels of it on the river, setting it on fire to float down and sink the boats. The detectives repeatedly ran up flags of truce, which were at once shot down. At length the advisory committee sent delegates to offer a safe-conduct to the detectives, if they would leave their arms and ammunition and quit the town under guard; they were forced to submit, but when leaving under escort, the mob stoned, shot, and clubbed them shockingly, one having an eye struck out by a woman in the mob. Seven were killed first and last, and 20 to 30 wounded; and 11 strikers and spectators were killed by their return fire from the boats. The governor (Pattison) refused to use the State power to quell the riot till the 10th, insisting that the local authorities must do their utmost first, and the sheriff must summon the citizens; and the troops did not arrive till the 12th, when the town was put under martial law. A committee of Congress was appointed to investigate the case; and later, a Senate committee in the interest of the strikers was appointed to inquire into the hiring of private armed parties to maintain public order. On 21 July Mr. Frick was shot and stabbed in his office, but recovered. On the 18th a number of the strikers were arrested for murder; and

HOMESTEAD AND LAND LAWS

retorted by indicting the Carnegie Company, the Pinkerton brothers, and five of their men, for murder. The advisory committee was also charged with treason and usurpation, in taking military possession of the town. The mills were soon supplied with new men, but the strike was not officially declared "off" till 20 Nov. 1892.

Homestead and Land Laws. Under the United States laws any citizen or person who declares intentions to become a citizen, male or female, 21 years old, or head of a family, may become the possessor of a homestead of 80 or 160 acres, by occupation and cultivation, to be taken from unreserved public lands, surveyed or unsurveyed. A fee of \$5 or \$10 is required to be paid for filing affidavit of settlement, citizenship, age or family status. Total fee is from \$26 to \$34, according to the land district. Five years' residence and cultivation are required, but only three are demanded where 5 or 10 acres of forest trees have been cultivated. Ex-Union veterans or their heirs obtain patent one year after residence. Benefits are limited to one claim, except that veterans who have made one land settlement may also take a homestead claim. Under timber-culture provisions homestead locators may secure another 160 acres, including timber area, by cultivating 40 acres of trees. A homestead is free from debt liability before patent issues. Locator may, on proof of settlement six months after occupancy, buy said land at pre-emption price.

Homestead discussion began in 1852 by the Free-Soil party demanding reservation for settlers. It was presented first in Congress by Galusha Grow, 1854. A bill was first offered in 1859, and passed the House; an act passed in 1860, granting homestead on payment of 25 cents an acre, was vetoed by President Buchanan. The present law was signed by President Lincoln, 20 May 1862. Homestead law initiated the national land policy. It marks the third step in definite change from purchase to settlement. Pre-emption policy, granting preference to occupancy over speculating purchases, was the second step. First was sale or grants *en bloc*. It began in 1801 when an act was passed granting pre-emption to Miami Valley settlers on Ohio-Symmes tract. Sixteen acts were passed before that of 1832, which fixed the price at \$1.25 and \$2.50, and divisions at 40, 80, 120, and 160 acres. Under Pre-emption Laws, a locator having civic rights and also able to testify that he or she does not possess 320 acres of land in the United States, or has not abandoned any to settle on public lands, can hold for cultivation and residence up to 160 acres. After a limited period a locator may on satisfactorily proving settlement, purchase and obtain patent at minimum or maximum rate, the latter, \$2.50, being paid for government land within railway grant. No restriction is placed on pre-emptor's acquirement of private lands. Under timber-culture acts entry additional to pre-emption or homestead may be made of legal subdivision, one fourth of which must be devoted for eight years to timber culture. On proof, a patent will issue for tracts; the total fee is \$18.

Timber acts are in the nature of a land bounty for forest culture in sub-humid areas.

Desert land acts are designed to encourage reclamation by irrigation of arid lands. Entry is of 640 acres permitted on "dry lands" within California, Nevada, Oregon, Arizona, New Mexico, North and South Dakota, Wyoming, Utah, Idaho, Montana, and Washington. Three years are allowed to bring water thereon. On proof of this, same may be purchased at 25 cents an acre. Under present laws mineral lands are held for industrial development, miners' customs being recognized by Congress and upheld by the federal judiciary. Locators form district, lode, or placer, adopt regulations, and elect recorder. Quartz or lode claims permitted of 1,500 lineal by 600 lateral feet, 300 on each side of lode. Boundaries must be marked plainly, entry recorded, and work to the value of \$100 or more be performed each 12 months in order to hold claim. Qualifications as to persons or associations are the same as in other land entries. No alien is permitted to hold, occupy, work, or possess public lands. Placer claims of 20 acres to the individual, or not over 160 to associations, are similarly permitted. Patents issue on proving up and payment of fees.

The mineral land policy of the United States fluctuated till the act of 1866 was passed. Lands were sold or leased at different periods, and the procedure was wasteful both to miners and people. Mill sites and right of way for ditches are provided for. Coal lands are pre-emptible on civic and occupancy requirements by payment of from \$10 to \$20 per acre. First priced land is not within 15 miles of a railway; the other is within such distance. The individual limit is 160 acres; association 320 acres. An association on proof of \$5,000 expenditure may enter one section. Only one entry is permitted. Saline lands being exempt from settlement, are offered for sale at \$1.25 an acre, and then become subject to private entry. Public land for town site purposes is arranged for (1) by Interior Department setting aside suitable area and selling lots of definite size; (2) by town associations, filing plats of 640 acres or less therein. Town associations failing to file plats, lots may be sold publicly after 12 months at increase of 50 per cent. on minimum price. The actual occupant of a town lot may prove up and pre-empt by time of sale, paying minimum price for same. Stone and timber lands designated as unfit for cultivation, within California, Oregon, Nevada, and Washington, may be purchased by persons having required civic qualifications as follows: Affidavit and proof of non-mineral character and non-speculative purpose required, and they must be sworn to as for personal use and benefit. Notice of application to be published for 60 days in land-office and nearest newspaper. Penalties are provided for perjury or for trespass on timber lands.

The domain is also subject to various land-grant and bounty laws. These include State grants for internal improvements, institutions, common schools, seminaries, and agricultural colleges; land bounties, naval and military; canal, wagon, and railway grants; military and Indian reservations. Under graduation act, land unentered privately can be sold at public sale at minimum figures. The public domain area was acquired by cessions from original States, 259,171,787 acres; by purchase from Spain,

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France, Mexico, Texas, and Russia 1,580,900,-800 acres; total, 1,840,072,587 acres.

Public lands are surveyed into "hundreds," 10 miles square; then into "sections," of 1 mile square, again subdivided into quarters, and down to eighths. This is known as the rectangular system. A general land-office, forming a bureau of the Interior Department, is in charge of land administration. Each State and Territory has a surveyor-general, and each congressional district a land-office. In the Territories these are provided as required. A large portion of the domain acquired from Mexico still remains subject to private grants. The land laws of Hawaii were drawn up to protect small holders. See PUBLIC DOMAIN.

GORHAM D. GILMAN,

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Homicide, hōm'ī-sid, is either justifiable, excusable, or felonious. Of the first sort are such cases as arise from unavoidable necessity or accident, without any imputation of blame or negligence in the party killing. So where a crime is punishable capitally according to the laws, the judge is bound to condemn the criminal to death, and the sheriff or other executive officer to carry the sentence into effect in the manner prescribed by the sentence of condemnation. But the judge must have jurisdiction of the offense, and be duly commissioned; and the executive officer must be empowered to carry the sentence into effect, and must perform the execution in the manner prescribed by law, otherwise the execution of the criminal will make the judge or the officer, as the case may be, guilty of criminal homicide. So, too, where an officer of justice is resisted in the execution of his office, in his attempt to arrest a person in a criminal, or, as is maintained, even in a civil case, he is not obliged to give back, but may repel force with force; and if the person resisting is unavoidably killed, the homicide is justifiable, for few men would quietly submit to arrest if, in case of resistance, the officer was obliged to give back. It is, however, laid down as law that if a felony be committed, and the felon attempts to flee from justice, it is the duty of every private citizen to use his best endeavors to prevent an escape, and if in the fresh pursuit the party be killed where he cannot be taken alive, it will be deemed a justifiable homicide. The same rule applies to cases of an attempt on the part of a felon to break away and escape after he has been arrested, and is on the way to jail. So if a party has been indicted for felony, and will not permit himself to be arrested, the officer having a warrant for his arrest may lawfully kill him if he cannot be taken alive. But this is to be understood only of officers, and not of private persons. Magistrates and officers authorized to suppress and disperse mobs are justified by the common law in taking the requisite measures and using the requisite force for this purpose, though it extend to the killing of some of the rioters. The law arms every private citizen in the community with the power of life and death for the prevention of atrocious felonies accompanied with violence and personal danger to others, as in case of an attempt to murder or rob, or commit burglary or arson, the person making the attempt may, by the common law, if he cannot be otherwise prevented, be killed on the spot, and the law will

not recognize the act as a crime. In cases of this sort, in order to justify the homicide, it must appear that there were good grounds for a suspicion that the person killed had a felonious intent. A woman is justifiable in killing one who attempts to ravish her, and the husband or father may be justified in killing a man who attempts a rape on his wife or daughter.

The cases already mentioned of justifiable homicide are those in which the public authority and laws are directly concerned. The laws of society, however, leave every individual a portion of that right of personal defense with which he is invested by those of nature. If one may interpose to prevent an atrocious crime against society, where he is not himself in any personal danger, the laws will, *a fortiori*, permit him to defend himself against attacks upon his own person. Murder is the killing of a person who is under the protection of the laws, with malice prepense, either express or implied. Malice is the distinguishing characteristic of murder, and may be either aforethought, or expressed, or implied. It is not necessary in order to constitute the crime of murder that the slayer should have the direct intention of killing. If the act be done with a wicked, depraved, malignant spirit, a heart regardless of social duty, and deliberately bent upon mischief, it is characterized by what the law denominates malice, though it may not result from any enmity or grudge against the particular victim. So if a man wantonly discharges a gun among a multitude of people, whereby any one is killed, the act will be done with that depravity of disposition which the law considers malice. Murder can be committed only by a free agent, for the crime presupposes a will, motive, or disposition on the part of the perpetrator. An idiot or insane person cannot commit this crime. But drunkenness is in general no excuse for homicide, though the act be done under its immediate influence.

The manner of killing is not material. Whether it be by sword, poison, beating, imprisonment, starvation, or exposure to the inclemency of the atmosphere, it will be equally murder. This crime may be committed by mere advice and encouragement. An infant unborn is within the protection of the law, and it is laid down that if, in consequence of poison given or wounds inflicted before the birth of a child which is afterward born alive, it dies soon after its birth, the act is murder. The act of suicide is considered by the law to be murder, and the person making away with himself is accordingly styled a "self-felon."

The lines of distinction between felonious and excusable or justifiable homicide, and between manslaughter and murder, are in many cases difficult to define with precision. But in general the accused has the advantage of any uncertainty or obscurity that may hang over his case, since the presumptions of law are usually in his favor. The characteristic distinction laid down in the books between murder and manslaughter is the absence of malice in the latter. Sudden provocation may be an excuse for striking another without the intention to give a deadly blow; and though death ensue, the party may not be guilty of murder. One circumstance, showing the degree of malice, or rather showing its presence or absence, is the kind of weapon

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used in giving a wound on a sudden provocation; and another circumstance of importance is the fact of the weapon's being already in the hand or not, for going to seek a weapon gives time for deliberation. The ground of excuse of homicide, in case of provocation merely, is the supposed sudden passion, some influence of which the law concedes to the frailty of human nature. But the excuse of self-defense goes still further; and where a man is attacked, so that his own life is endangered, or in such way that he may reasonably suppose it to be so, he may repel the attack with mortal weapons. One of the most frequent cases of manslaughter was that occasioned by single combat, and on account of the firm hold which the point of honor had taken of European nations, was long among the most difficult subjects of legislation. (See DUEL.) The crime of murder in its most aggravated degree is punished with death in most parts of the civilized world.

Homily (Greek, *homilia*, intercourse), as an ecclesiastical term, a discourse addressed to an audience on some subject of religion. The homily was so called to distinguish it from the speeches of profane orators. The ancient homily was sometimes simply a conversation, the prelate talking to the people and interrogating them, and they in turn talking to and interrogating him. The difference between the homily and the sermon was the entire absence of oratorical display from the former, and the elucidation of the Scriptural text in natural order, without throwing the exposition into the form of an essay.

The earliest existing examples of the homily proper are those of Origen in the 3d century. In the schools of Alexandria and Antioch this form of discourse was sedulously cultivated, and Clement of Alexandria, Dionysius, and Gregory Thaumaturgus are among the names most eminent in this department. Augustine and Gregory the Great were among the western composers of homilies. Later still Bede, several of the popes, and foreign ecclesiastics still adhered to the homiletic form of exposition as the most suitable to impress the truths of Scripture with efficacy on the popular mind.

In the Church of England there were two books of homilies that were long authoritative, and are still sometimes appealed to to settle disputes as to what the Anglican doctrine is in points on which they bear.

Homing-pigeon, a variety of the common pigeon in which the love of home and power of flight have been developed to make the bird useful and reliable as a bearer of messages; also a fancy variety characterized by the possession of certain definite points, but not necessarily useful as a homer. The show carrier-pigeon is a large, long-necked variety, with abnormally developed wattles about the base of the beak and round the eyes, but the true homer is of smaller size, and lacks the enormous tuberculated growth.

The training and breeding of homing-pigeons were long almost confined to Belgium, and two main types of the Belgian homer have been distinguished as the Antwerp and the Liège varieties, the former being larger but less graceful in form than the latter. American pigeon fan-

ciers breed mainly from the Antwerp type, and the birds are commonly designated Antwerps.

The training of a homing-pigeon begins when it is about three months old. It may then be taken to a distance of about a mile from its loft in a suitable direction and liberated in order that it may fly back. After an interval of a day or two it should be carried three miles from home in the same direction and set free, and on the third occasion, a few days later still, the distance is usually increased to six miles. This mode of training is continued steadily during the season, the successive distances above those already mentioned being 12, 25, 50, 75, 96, 125, 155, and 200 miles. The intervals of rest must be carefully preserved, especially in times when the weather is unfavorable. During the bird's second season it is made to repeat something of its first year's performances and to extend its flight to 250 miles or possibly to a greater distance. During the following three seasons good birds will be at their best, and even for some few years later they may do good work. During the training period and also at other times the housing and feeding of the birds must be carefully attended to.

Velocities of over 30 yards per second have been recorded for various pigeons, but the average velocity is rather less than half that amount. One bird, in 1896, actually covered the distance from Thurso to London, just over 500 miles, within one day, its average velocity being about 24 yards per second. In unfavorable weather the height attained varies from about 320 to rather over 400 feet, but in good weather some birds will reach a height of about 1,000 feet. The distance from Algiers to Paris, fully 1,100 miles, is one of the longest on record as having been traveled by a pigeon.

There has been much discussion regarding the means by which pigeons return to their homes over such long distances. Untrained birds often fail to return, and during training young birds are often lost.

Many instances are recorded of the employment of pigeon messengers by ancient peoples. During the first half of the 19th century pigeons were widely used in Great Britain for the rapid communication of intelligence, and in particular many stockbrokers obtained early information of the state of the markets by this means. The introduction of the electric telegraph, however, soon led to the complete disuse of the pigeon post. The siege of Paris during the Franco-German war of 1870-1 first brought the carrier-pigeon into prominent notice as a valuable means of communication in time of war. During that siege more than 350 birds were sent out of the city in balloons, and of these some 300 were liberated with messages. Only some 70 returns were made, and these were effected by 57 birds. By the adoption of microphotography the space occupied by a message was so reduced that a single pigeon could carry a very large number of messages without having its movements hampered in the least. One of the pigeons that succeeded in returning to Paris carried no less than 40,000 messages on eighteen collodion films which were enclosed in a goose-quill attached to the tail. Since that time the leading Continental powers have established elaborate pigeon systems for use in time of

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war. During the war with Spain, in 1898, the fleet of vessels that patrolled the Atlantic coast was supplied with a number of carrier-pigeons' cotes, but happily there was no occasion for testing their effectiveness, though in times of peace messages are frequently successfully carried from war vessels to points on the shore. Consult books mentioned under PIGEONS.

Hominidæ, hō-mīn'ī-dē, the family to which man was assigned in the earlier systems of animal classification; but many modern zoologists refuse him so great a distinction, making man, zoologically considered, only a species (*Homo sapiens*) of a genus of the family *Simiida*, which also includes the genera of the anthropoid apes. See MAN.

Homœopathy (Greek *ὁμοιος*, like, and *πάθος*, suffering or disease). The term signifies similar affection, passion, suffering or disease. As employed in Medicine, and as understood by Hahnemann and physicians of the homœopathic school, it is properly defined as follows: (1) The treatment of disease by means of its similimum; (2) treatment of disease by a medicine capable of causing, in a healthy person, symptoms similar to those manifested by the patient. This definition can refer only to the symptoms producible by the drug, and the symptoms exhibited by the patient. It makes no direct reference to the name or type of the disease, nor to the type or class of the drug administered, nor to the size or strength of the dose. Nevertheless, homœopathy does hold important incidental relationship to the classification of drugs, to the facts and principles of dosage, and to diagnosis and all other departments of pathology. Under this definition, the experimental application of homœopathy requires that the drug shall cover the *tout ensemble*—or, as Hahnemann expresses it, the "totality" of the symptoms as exhibited by the patient; and not merely one, or a few, of the dominant or diagnostic symptoms or conditions. Neither does it imply that the homœopathic remedy can overcome any and all the adverse conditions and circumstances under which it may be administered.

As a system of medical practice, Homœopathy recognizes this principle of similarity as between the symptoms of the curative drug and the symptoms appearing in the patient. In this form of practice, the symptoms exhibited by the patient are carefully ascertained and studied with reference to their significance and relations, and these furnish the indications upon which the selection of the "similar remedy" is then made with equal care. Whether the object of the prescriber be immediate and complete restoration to health in a curable case, or mere alleviation of suffering in a case not curable, the same course is pursued; since, in the experience of the profession, the similimum possesses peculiar efficacy in either class of cases.

In homœopathic practice, the finding of the curative remedy is of *first* importance, as a matter of course. But, the diagnosis of the case is a most urgent consideration, because it materially aids the physician in his quest for the "totality" of the symptoms, suggests his general management of the case, prompts the sanitary precautions to be taken, guides him in his prognosis, etc. Moreover, it sometimes calls

to his mind a group of medicines among which the curative similimum will probably be discovered, and in this indirect way may assist in the medical treatment. Yet is must be distinctly understood that in homœopathic prescribing, the final choice of the remedy is always made, not by the name of the disease, nor even by the symptoms usually present in the disease, but only by those occurring in the individual patient. Pathology, both structural and functional, is also a subject of careful research in connection with homœopathic practice, as under other systems; but never for the purpose of formulating "theories" of the nature of the disease, on which to base treatment.

In common with all other modern "schools" of physicians, homœopaths hold that whenever the originating or "exciting" cause of the disease can be discovered, it should be removed if possible; and they claim that when this is done the disease will often disappear spontaneously. When the disease does not so disappear after removal of the cause which had apparently produced it, homœopathic physicians are convinced that some other ("maintaining") cause has been developed. In most cases this perpetuating cause is occult and its nature altogether undiscoverable. They also hold the view that if this latter cause be removed, the continuance of the malady is inconceivable. Equally incredible is it that the disease can be actually "cured" so long as the cause remains operative; if it could be, it would be immediately reproduced; unless meantime the bodily susceptibility to the disease were also removed. Hence, the homœopathic profession does not concede a "cure" in any case in which the operative cause remains active, and therefore, in the view of these practitioners, the word "cure" has a much narrower meaning, and actual cures are accomplished much less frequently than is generally supposed; the majority of such so-called cures being merely recoveries—recoveries facilitated, or perhaps made possible, by the skilful efforts of the medical practitioner—but recoveries nevertheless.

Under this view, that the disease has a central morbid cause, it is impossible that homœopaths can accept the opinion that the malady can be cured by the mere lopping off of one or a few of its principal symptoms, or of its prominent pathological processes or conditions. How, then, do homœopaths explain their ability to reach with their remedies the perpetuating or "maintaining" cause of disease, conceding, as they do, their inability to determine its nature, or even its location?

Starting out with the accepted principle that "like causes operating under like conditions produce like effects," the homœopathist assumes the converse of the proposition to be likewise true; namely, that like results appearing under like conditions and circumstances, indicate the operation of like causes. When two patients in similar conditions of health manifest similar morbid symptoms, the phenomenon is, by all pathologists, considered as indicating the operation of causes in corresponding portions of the two organisms, and acting in a similar manner. This view is not peculiar to any medical school, but is held by all physicians alike. To this doctrine, the homœopathist adds the belief that it also applies to the effects of drugs, as well as to those of natural (?) diseases; and that when similar

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morbid manifestations result, in one case from disease and in the other from the effects of a drug, the phenomenon still indicates a physiological or (pathological) cause operating in a similar part or parts of the organisms involved, and operating in a similar manner in both. So much as to the *locality* of the cause—the “seat of the disease,” upon which the “similar” drug acts. What of the *manner* in which it acts?

It was long ago shown by Hahnemann and others that the effects of almost any drug upon the human body are of two kinds, primary and secondary, direct action and reaction; and that these two actions are, in a measure, the opposite, one of the other. This view has been advocated by numerous physicians, not always of the homœopathic school. Of late years the phenomenon has attracted more attention from medical writers than formerly, and is generally spoken of as “the dual action of drugs.” To illustrate: a drug may first stimulate, and afterward depress, a certain organ of function. Another may first depress and then stimulate; and the symptoms will, of course, take their character from the action or reaction of the drug. Some homœopaths are of opinion that this dual quality of drug action is the proper explanation of the curative potency of the *similimum*. Others, Hahnemann included, explain it on other grounds. Others consider it likely that the different effects of large and small doses—a fact observed by many practitioners—may account for the cures made by the similar remedy. All homœopaths agree, however, that the question turns upon the curative *fact*, and not upon its explanation; and hold that one and all of these explanations may yet prove to be erroneous; yet firmly convinced that the main fact will remain unaffected through all changes in theory and doctrine.

Homœopathy, like any other principle or art, has its own particular field of application and operation. Thus it does not cure *directly*, a mechanical injury to the tissues, or any impairment wrought by chemical means; though it does cure the functional diseases and disorders caused by the irritation of such injuries. The homœopathic remedy acts *directly* only upon function. It never alters a structure except by first modifying a function. Nor does a drug ever act homœopathically upon a function unless that function be disordered. When a drug acts on a healthy function, or when it causes disorder in a function, such action is never homœopathic, whatever may be the mode of its selection and whatever the form or quantity in which it is administered. *The homœopathic medicine is a specific-restorative-stimulant, only and always.* Such, in brief, is an exposition of homœopathic belief and practice, and of its underlying principles and doctrines as taught by Hahnemann and held by the profession as a body. The small dose used by homœopathic prescribers is considered in another part of this article.

Homœopathy as a mode of medical practice is usually said to have originated in 1796, when Dr. Christian Friedrich Samuel Hahnemann published in ‘Hufeland’s Journal,’ at Jena, an ‘Essay on a New Principle for Ascertaining the Curative Powers of Drugs.’ In this essay he criticizes the state of the medical art,

and especially urges that the chemical properties and powers of drugs are not adapted to the work of curing disease, but that cures must be accomplished by an entirely different property resident in medicinal substances. Having read of cures in medical literature and observed, in his own patients, recoveries occurring under the evident influence of the “similar” remedy, he offers the following theory of the phenomenon: “Every powerful medicinal substance produces in the human body a kind of peculiar disease; the more powerful the medicine, the more peculiar, marked, and violent the disease. We should imitate nature, which sometimes cures a chronic disease by superadding another, and employ, in the (especially chronic) disease we wish to cure, that medicine which is able to produce another very similar artificial disease, and the former will be cured; *similia similibus.*” Hahnemann further explains his conception of a homœopathic cure in his ‘Organon,’ section 26, in the following language: “A weaker dynamic affection is permanently extinguished in the living organism by a stronger one, if the latter (while differing in kind) is very similar to the former in its manifestations.” This language he designates the “homœopathic law of nature.” The term “homœopathy” or “similar disease,” as representing the new medical practice, may have been suggested not alone by the fact of cures produced by the similar drug, but also by Hahnemann’s theoretical explanation of the phenomenon.

A correct and adequate conception of homœopathy, of the difficulties necessarily encountered in its propagation and establishment, and of the place it holds and the influence it exerts in the development of therapeutics can be obtained only through knowledge of the conditions of general medicine down to the close of the 18th century. It is essential, therefore, that reference be made to certain points in the progress of medical history from its beginnings to and including the period of the investigations that resulted in the discovery of homœopathy as a general therapeutic principle. This reference does not need to embrace all the departments of medical science—anatomy, physiology, pathology, etc.—but the department relating to treatment, or therapeutics only. It is requisite for us to know and appreciate the mental conception—the basis of reason—upon which the “art of healing” was established prior to the advent of homœopathy as a system of medical practice.

The earliest efforts of men to alleviate the sufferings caused by illness and mechanical injury were chiefly instinctive. Water, moist earth, the fleshy portions of plants, and other cooling substances, were employed by men, as well as by the lower animals, to mitigate the pain, heat, and discomfort of local inflammation; and other simple expedients were instinctively resorted to for various disordered conditions. In time the number and variety of known remedial agents, as well as of the diseases for which they were used, must have been rapidly extended by experience. And thus began the “empirical method” of treatment—the natural second step in the progress of medicine.

Inefficient as were these modes of treatment, they were far more rational than most of those that occupy the pages of medical history for many succeeding centuries. These later methods were based, not on observation and experience,

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But upon pure assumptions having, as John Stuart Mill expresses it, "no limitations other than those of the imagination." (The construction of medical theories, or philosophical explanations of observed facts, was a still later development.)

Among the large number of these hypotheses are the following: (1) That disease is a punishment sent by some malevolent deity; (2) that it is due to the influence of a comet, a planetary conjunction, an earthquake, or some other celestial or terrestrial phenomenon; (3) that it is caused by abnormal preponderance of some one of the four elements (fire, air, earth, and water) of which the human body was said to be composed; (4) that it originates in a disturbance of the bodily states of heat, coldness, moisture, and dryness; (5) that it arises from disproportion in the four humors which supply the organism—blood, mucus, black bile, and yellow bile; (6) that it is produced by a *materia peccans*, or offending matter, which must needs be expelled; (7) that the body contains multitudes of "invisible pores" through which circulate infinitesimally minute atoms or corpuscles, and that disease has its cause in obstruction or relaxation of these pores; (8) that disease is based upon three possible states of the organism—"strictum," "laxum," or "mixtum"—which must be treated with laxatives, astringents, or a combination of both, as might be needed; etc., etc. All these hypotheses, and many others, arose prior to the close of the 2d century A.D. Their absurdity is not more grotesque than that other hypothesis which underlies each and all of them; namely, that a knowledge of the cause or nature of disease can indicate the means and method of its cure; a view not held at present by any homœopathic or other scientific physician.

The period between the 2d century and the 15th presents little record of therapeutic art; but with the invention of the printing-press came a stronger impetus to all forms of research, medical included. Since that time increasing knowledge of anatomy, chemistry, and physiology has led to the elaboration of therapeutic theories based upon certain facts relating to these natural sciences. The advances in anatomy had suggested a mechanical basis for therapeutics; pneumatics, friction of fluids in vessels, the diameters, curvatures, and angles of blood-vessels were brought forward to explain the phenomena of disease and to suggest measures for its cure. Physiology and chemistry brought out a renewal of the ancient doctrine of "four elements" and the substitution of the three "alchymistic symbols" represented by mercury, salt and sulphur, whose union is health, and their separation disease. The author of this doctrine, Paracelsus, also ascribed to the "vital force" not only the power, but also the intelligence, to resist disease and to provide for its cure. About the middle of the 18th century, or near the time at which the discovery of the general principle of similars was made, physiological hypotheses became largely identified with therapeutics; and the same might be said of chemical theories. Health and disease were the results of a contention between the acids and the alkalis. Haller held to the view that disease was due to change in the "irritability" of the tissues. Cullen revived an old doctrine that disease was caused by "spasm" and "atony," and required to be treated in accordance with that view. Brown, the rival of Cullen, concluded that diseases were either "sthenic" or

"asthenic," and required asthenic, or sthenic medication, as the case might be.

Before the close of the 18th century the medical profession had acquired knowledge of a number of drugs possessed of "specific" properties for the cure of particular diseased conditions; among them Peruvian bark for intermittent and other malarial fevers, mercury for syphilitic diseases, sulphur for itch, etc. These specifics exerted their curative effects by virtue of properties not at all understood at that time, and but imperfectly known a century later. These specific cures were limited to comparatively few diseases. For the treatment of the conditions with which the medical practitioner is contending daily, which constitutes almost his entire duty, he had nothing but fallacious assumptions and hypotheses to depend on. Such was the condition of the medical art at the time when Hahnemann began his independent researches in therapeutics.

Hahnemann possessed unusual linguistic attainments, which gave him access to the publications not only of Germany, but of England, France, Spain, Italy, Austria, Greece, and Arabia. He was not only a literary scholar. He was also a practical expert in the fields of chemistry, pharmacy, and industrial technology. He made many discoveries in industrial chemistry, and introduced scores of improvements in the details of manufacturing chemical products. At the period of his earliest responsible connection with medicine, "there was," says Rapou, "complete anarchy in the domain of therapeutics." Hahnemann, unwilling to trust the lives of his patients to the tender mercies of this conglomeration of assumptions, adopted the use of the class of remedies known as specifics, whose effects were easily ascertainable, though their *modus operandi* was altogether unknown.

Homœopathy was not an invention, like some of the "systems" of medicine that preceded it; neither was it a sudden discovery. It was an evolution extending from 1790 to 1835, a period of 45 years. The earlier portion of the process is described by Bradford, who in speaking of its beginning says: "We now come to the translation of a very important book (Cullen's 'Materia Medica'), from which must be dated the discovery of the Law of Similars. It has been asked why Hahnemann at this time happened to translate this particular book, and it has been asserted that he used it as a blind to foist on the world his peculiar theories. It is not probable that when he commenced upon Cullen Hahnemann had any particular medical theories, but only a growing disgust for the medical fallacies of the day. This is clearly evidenced by his writings at that time. It is not to be wondered at that he should translate the work at that particular time. He was translating for money, for the booksellers and publishers of Leipsic, and it is not likely that he selected the books which he was to translate. Dr. Cullen was an authority on the subject of the *materia medica* of his day, an experienced lecturer, a talented chemist, and a brilliant and popular teacher in Edinburgh. Naturally the Germans wished to learn of his new and peculiar theories regarding disease, as well as to obtain the use of his 'Materia Medica,' which at this time was a standard work.

"Hahnemann was the most accomplished translator of medical works of the time, and

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what more natural than that the task should be given to him. Cullen published the first edition of this book, in London, in 1773. Another edition was issued in 1789, in two volumes, and it was this edition that Hahnemann used in his translation. In this book, Volume II., Cullen devotes about 20 pages to *Cortex Peruvianis* (Peruvian Bark), gives its therapeutical uses in the treatment of intermittent and remittent fevers, advises its use to prevent the chill, and gives minute directions for the safest period of the disease in which to use it. Hahnemann was impressed with the use of this drug, with which he as a physician had before been familiar. Something in the manner in which Cullen wrote decided Hahnemann to experiment with it upon himself and to see what effect it would have upon a person in perfect health. The result of this experiment will be given in Hahnemann's own words. In the translation of William Cullen's 'Materia Medica,' Leipsic, Schweikert, 1790, page 108 of Volume II., appears the following foot-note by Hahnemann: 'By combining the strongest bitters and the strongest astringents, one can obtain a compound which, in small doses, possesses much more of both these properties than the bark, and yet no specific for fever will ever come of such a compound. This the author (Cullen) ought to have accounted for. This perhaps will not be so easily discovered for explaining to us their action in the absence of the Cinchona principle.

"I took, by way of experiment, twice a day, four drachms of good *China*. My feet, finger ends, etc., at first became cold; I grew languid and drowsy; then my heart began to palpitate and my pulse grew hard and small; intolerable anxiety; trembling (but without cold rigor); prostration throughout all my limbs; then pulsation in my head, redness of my cheeks, thirst, and, in short, all those symptoms which are characteristic of intermittent fever, made their appearance, one after the other, yet without the peculiar, chilly, shivering rigor.

"Briefly, even those symptoms which are of regular occurrence and especially characteristic—the stupidity of mind, the kind of rigidity in all the limbs, but above all, the numb, disagreeable sensation which seems to have its seat in the periosteum, over every bone in the body—all these made their appearance. This paroxysm lasted two or three hours each time, and recurred if I repeated this dose, not otherwise; I discontinued it, and was in health."

"The next note in the German translation is as follows: 'Had he (Cullen) found in bark traces of a power to excite an artificial antagonistic fever, he certainly would not have persisted so obstinately in his mode of explanation.' " ('Life and Letters of Dr. Samuel Hahnemann,' by T. L. Bradford, M.D., pp. 35-7.)

These experiments seemed to show that Peruvian bark is capable of producing in the healthy human organism a series of symptoms quite closely resembling those of that peculiar form of fever which it is known to cure. Instead, however, of solving any questions in the mind of Hahnemann, it only served to suggest several others. Does Peruvian bark then produce the same symptoms that it specifically cures? Is its specific curing property dependent on its power to cause the symptoms which it cures? If so, is this power peculiar to *Peruvian bark*,

or is it to be discovered in other drugs? And do all drugs possess the power to cause symptoms similar to those they cure?

To obtain light upon these questions occupied his efforts during the six years between the translation of Cullen's 'Materia Medica' and the publication of the 'Essay' above mentioned. To quote from a writer in the British 'Homœopathic World,' 1875, p. 234: "Drug after drug, specific after specific, was tested on himself and on healthy friends with one unvarying result—each remedy of recognized specific power excited a spurious disease resembling that for which it was considered specific. But many more symptoms than those diagnostic of any one disease resulted from almost every medicine, and aroused a hope in the experimenter's mind of specifically treating a greater number of diseases than had ever been so treated before. Besides discovering many valuable phenomena undreamt of, he verified his discoveries and observations by ransacking the volumes of recorded experiments in materia medica and the whole history of poisoning." The members of his family and his personal and professional friends aided in the work of experimentation, and tests of each medicine were made with different doses, and on many different persons, all the work being conducted under his own supervision.

Dr. Bradford tells us that at the time of Hahnemann's translation of Cullen's 'Materia Medica,' that is, at the beginning of his independent investigations in 1790, he had no preconceived theories or opinions to sustain. This view of his biographer is corroborated by the absence from Hahnemann's writings of even remote reference to any *a priori* conception or suspicion of a general curative relation between drugs and diseases. Nor does it appear that he then possessed the faintest conception of the magnitude, or of the quality, of the task he was gradually assuming. His original object evidently was to ascertain why Peruvian bark cures intermittent fever, and to learn if the view held by Cullen—that its curative property resides in a combination of bitter (tonic) and astringent qualities—was indeed true. There is no historic evidence that before 1790 the general therapeutic principle of similars had even dawned upon his mind. But we may be quite sure that the logical and philosophical principles that must necessarily govern his researches had been well thought out before the work had very far advanced.

Hahnemann and his disciples claim that in the discovery of homœopathy as a general principle of organic science, and in its conception and development as a system of medicine, assumption, speculation and hypothesis have had no place; but that observation, experimentation, and inductive classification constitute the scientific and solid foundation of fact upon which it rests. They assert that all its essential doctrines are susceptible of demonstration, that they have been verified and reverified times without number, and that for the first time in the history of intellectual development the establishment of the homœopathic principle showed that the Baconian method of research is as applicable in the realm of therapeutics as in any other department of scientific investigation. If we look over the records of the processes leading to its discovery, it appears that these processes were

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under the guidance of the following principles of scientific philosophy, all of which are distinctly set forth by Hahnemann in his 'Organon':

1. That in the study of disease with a view to its cure, the only safe dependence is upon the manifestations (symptoms) perceptible to the senses, and that no safe conclusions can be drawn from mere theories erected upon these signs and symptoms. The signs and symptoms constitute the only side of the disease that is turned toward the physician, and the totality of these signs furnishes the only true expression or portrait of the disease.

2. That the specifically curative power of a drug resides not in its physical, nor yet in its chemical properties, but in its capacity to produce changes in the functions of the organism.

3. That the dynamic properties of a drug—in other words, its power to specifically cure disease—can be ascertained only by observing the signs and symptoms which it can produce in the organism, and that these specifically curative properties cannot be inferred from the physical or chemical properties of the drug substance.

4. That experiments for the purpose of ascertaining the pathogenetic properties (signs and symptoms) of drugs must be conducted under the precautions necessary in other researches; and the tests must be repeated and varied with a view to eliminate every influence and agency that can vitiate the experiment. The drug experimented with, and the person experimented upon, must both be "standard." That is, the drug must be pure and unmixed with any other substance capable of disguising, modifying, or otherwise affecting its own specific activity, and the person experimented upon (prover) must be possessed of good health, and free from any unhealthy occupation or habit, and from any mental, moral, or other influence or agent that can modify the pure effects of the drug upon his organism. Also, that the experimentation with the drug must be continued until its whole pathogenetic effect has been elicited.

5. That the observations made from such experiments as those here indicated constitute the only source of a pure and "standard" materia medica, and supply the only material from which general therapeutic principles can be discovered or deduced.

6. That effects observed from the action of a drug upon diseased persons (clinical effects) or those obtained from a combination of drugs (polypharmacy) are not "standard" effects and cannot serve as reliable guides in a search for therapeutic principles.

In the opening sections of the 'Organon,' Hahnemann mentions as among the physician's essential acquirements:

- (1) Knowledge of diseases; (2) knowledge of the dynamic properties of drugs; (3) knowledge of the curative relations between the two. This knowledge he holds essential both to the development of therapeutic science and to enable the physician to prescribe the curative remedy.

In order to qualify the physician for his work his knowledge of disease must be composed of facts perceptible to the senses. Our physiological and pathological deductions in reference to a case of disease are more or less uncertain and theoretical. Absolute knowledge of disease is limited to its signs and symptoms, besides which

there can be no certain and assured foundation for a science of therapeutics.

The knowledge of drug-properties must be equally certain and substantial. All drugs possess three classes of properties—physical, chemical, and specific or "dynamic." The physical and chemical properties can be ascertained by physical and chemical methods. The specific or dynamic properties, that is, the properties which alone impart the power to accomplish specific cures of disease, can be learned only by observing their power to cause changes in the health of the organism as shown by their capacity to produce signs and symptoms. Here again the signs and symptoms constitute the only sure basis of classification and induction in the construction of a science of therapeutics.

Having possessed himself of so much of such knowledge as was within his reach, Hahnemann then began the investigation of the great and dominating question: Given a knowledge of diseases as expressed by signs and symptoms, and a knowledge of drug properties as expressed by signs and symptoms, can we discover between them any general relation that will guide the physician in his search for the curative drug? In this work of "interrogating nature" he had already been led to infer what her reply might be. His experiment with Peruvian bark had given him a somewhat emphatic hint. Then followed the six years of experimentation upon himself, his family, and friends; with what result we have already seen. Accompanying and following these experiments came the "ransacking of the libraries"—a work for which few men were so well fitted. This literary search resulted in two important discoveries. First, that when two diseases manifesting quite similar symptoms appear in the same organism, they antagonize or annihilate each other. This subject is carefully outlined in the 'Organon,' sec. 42-45, and in sec. 46 the writer cites a score of illustrative instances obtained from the pages of contemporaneous literature, the authority being carefully mentioned in every citation.

The second result of this literary search is that it corroborates the view with which Hahnemann set out; namely, that even under the modes of treatment in vogue before his day, undoubted cures frequently resulted from the action of drugs possessed of the power to cause symptoms similar to those of the cases cured. Some of these cases are well worthy of study by those interested in medical subjects. In the earlier editions of the 'Organon' and in the 'Essay on a New Principle for Ascertaining the Curative Powers of Drugs,' these published cures are reported *in extenso*, the literary source being given, together with the name of the physician in each case. In the Dudgeon translation of the 5th German edition the same list occupies 31 pages of the appendix. In practically all of the cases reported, the mere name of the disease is sufficient to suggest the fact of similarity between the symptoms of the malady cured and the symptoms of the drug prescribed. In other cases the symptoms themselves are given with more attention to detail than was customary at that period of medical history. If we sum up the remedies named in the 'Essay,' together with those mentioned in the 'Organon,' we have a total of 63 drugs to which Hahne-

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mann was able to ascribe homœopathic cures occurring in the practice of physicians who had no knowledge of the homœopathic principle.

In presenting this list of cases successfully treated with the similar remedy, Hahnemann has made nearly 500 citations of writers who had no suspicion that any general law of therapeutics was involved in the operation of their prescriptions. The degree of similarity shown between the pathogenetic properties of the drugs administered and the symptoms manifested by the patients seemed, in most cases, to be positive and emphatic, and in some instances striking. In what he has to say regarding the curative effects of opium this fact is graphically shown. He says:

"A condition of convulsions without consciousness, resembling the death-agony, alternating with attacks of spasmodic and jerky, sometimes also sobbing and stertorous, respiration, with icy coldness of the face and body, lividity of the feet and hands and feebleness of the pulse (precisely resembling the symptoms of opium observed by Schweikert and others), was at first treated unsuccessfully by Stütz with potash, but afterward cured in a speedy, perfect, and permanent manner by opium. According to Vicat, J. C. Grimm, and others, opium produces an extreme and almost irresistible tendency to sleep, accompanied by profuse perspiration and delirium. This is the reason why Osthoff was afraid to administer it in an epidemic fever which exhibited similar symptoms, for the system he pursued prohibited the use of it under such circumstances. It was only after having employed in vain all the known remedies and seeing that death was imminent that he resolved to try it at all hazards, and behold, it was always efficacious. J. Lind also avowed that opium removes the head troubles, and the burning sensation in the skin and the difficulty of perspiring during the pyrexia; under opium the head becomes free, the burning febrile heat disappears, the skin becomes soft, and its surface is bathed in a profuse perspiration. But Lind was not aware of the circumstance that opium produces very similar morbid symptoms in the healthy. Alston says that opium is a remedy that excites heat, notwithstanding which it certainly diminishes heat where it already exists. De la Guérène administered opium in a case of fever attended with violent headache, tension and hardness of the pulse, dryness of the skin, burning heat, and hence difficult and debilitating perspirations, constantly interrupted by the extreme restlessness of the patient. He was successful with this case because opium possesses the faculty of creating an exactly similar feverish condition in healthy persons, of which he knew nothing, though it is stated by many observers. In a fever where the patients were speechless, eyes open, limbs stiff, pulse small and intermittent, respiration labored, snoring, and stertorous, and deep somnolence (all of which are symptoms perfectly similar to those which opium excites), this was the only substance which C. L. Hoffmann saw produce any good effects. Wirthen-son, Sydenham, and Marcus have in like manner cured lethargic fevers with opium. C. C. Mathai, in an obstinate case of nervous disease, where the principal symptoms were insensibility and numbness of the arms and legs, after

having for a long time treated it with inappropriate remedies, at length effected a cure by opium, which, according to Stütz, Young, and others, causes similar states in an intense degree. Hufeland performed, by the use of opium, the cure of a case of lethargy of several days' duration. How is it that opium, which, as everyone knows, of all vegetable substances is the one which in its primary action (in small doses) produces the most severe and obstinate constipation, should be one of the most efficient remedies in constipation of the most dangerous character, if not by virtue of the homœopathic therapeutic law, so long unrecognized? The honest Bohn was convinced by experience that opiates were the only remedies in the colic called 'miserere'; and the celebrated F. Hoffmann, in the most dangerous cases of this nature, placed his sole reliance on opium combined in the anodyne liquor called after his name. Can all the 'theories' contained in the 200,000 medical books which cumber the earth furnish us with a rational explanation of this and so many other similar facts?"

The great German physician and philosopher was careful to credit other medical men with having obtained foregleams of his great discovery. "How near," he says, "was the great truth sometimes of being apprehended!" And again: "There have been physicians here and there across whose minds this truth passed like a flash of lightning without ever giving birth to a suspicion of the homœopathic law of nature."

From Hahnemann's literary and experimental investigations alone, both he and his disciples have unhesitatingly justified their belief in a general curative relation between drugs, as represented by their symptoms, and diseases as represented by their symptoms, and their belief that this curative relation is properly set forth by the word "similarity." The proofs herein presented are considered conclusive, although similar evidence has been constantly accumulating in the writings of medical men of all schools, and in the practice of hundreds and thousands of homœopathic physicians for more than a century.

In Hahnemann's foot-note (see Dudgeon's Appendix to the 'Organon,' p. 207) it is shown that he early became aware of the "danger which is to be anticipated from large doses of homœopathic remedies." He says, however, that "it often happens, from various causes which cannot always be discovered, that even very large doses of homœopathic medicines effect a cure, without doing any particular harm." In most instances homœopathic physicians came to regard the small dose as a necessity to homœopathic practice. Thus, a full dose of belladonna, or of opium, administered to a patient already suffering with symptoms like those producible by one of these drugs, might be perilous. Experience also taught them that the curative action of the homœopathic drug could be secured as well or even better through the small dose. The results claimed for these small or minute doses naturally aroused the skepticism of physicians and laymen alike, and became a serious hindrance to the spread of the homœopathic system. The very nature of the homœopathic principle, however, carries with it the necessity for the use of the diminished dose.

Homœopathic physicians, when prescribing minute doses of their remedies, are under the necessity of employing great care in securing absolute purity and simplicity in the preparation of their medicines; and this has led to the need of a special pharmacy for homœopathic prescribers. Another corollary of the homœopathic law of cure is the "single remedy," without which no prescription can be strictly homœopathic. Still another principle follows from the application of this law: namely, that a homœopathic prescription can never be made from the *name* of the disease. The similarity must be traced between the symptoms of the drug and those of the individual patient. This fact is fortunate in that it at once brands the advertised "homœopathic" proprietary medicine as a fraud and a pretense; no matter in what form it may be put upon the market.

The spread of homœopathy in the country of its birth, and in other countries of Europe, has been slow. The delay in securing its establishment has been due partly to the cause already mentioned—an unwillingness on the part of both physicians and laymen to accredit the little dose with curative potency. But the chief obstacle to its advancement is to be sought in inimical legislation and the lack of facilities and authority to educate young men and women for homœopathic professional life, and the consequent inability to supply the public need of homœopathic physicians.

Homœopathy was introduced into the United States in 1825 by a physician named Hans B. Gram, who at that time settled in New York. In this country, with its free institutions and its asserted freedom of opinion, the new medical thought found less antagonism to overcome, although there were many obstacles to be encountered, chiefly of a social and legislative character. The physicians of America, less conservative, perhaps, than those of Europe, were more disposed to inquire into the scientific and practical aspects of homœopathy, with the result that in less than 20 years more than 300 of them were engaged in its practice. These physicians speedily conceived the necessity for having their own students educated under teachers of their own faith and practice, and in 1848 organized and equipped a medical college for this purpose. This school was almost immediately succeeded by others; and these institutions have very largely contributed to the rapid spread of homœopathic practice in all parts of the United States.

When Dr. H. B. Gram arrived in New York in 1825, the only homœopathic literature in the English language was Hahnemann's '*Geist der homöopathischen Heilkunst*,' a pamphlet of 24 pages, translated by himself and published by J. & J. Harper, of New York. The remaining homœopathic literature was all in the German language, and it is recorded that such was the interest felt in the subject that numerous converts to Hahnemann's system, some of them past middle life, pursued the study of German in order to facilitate their investigations in homœopathy. At the close of the first quarter-century of the new practice, more than 25,000 pages in the English language had been published by the homœopathic press, and at the end of 50 years the aggregate reached more than 150,000 pages. (See '*Transactions of the World's Homœopathic Convention of 1876*, Vol. II., pp. 1020-65.)

The progress that homœopathy has made in the United States can be best shown by the records of its organizations and institutions. The American Institute of Homœopathy, the national society of homœopathic physicians, organized in 1844, now has a membership of over 2,000. There are six other national organizations, formed to promote various departments of medical and surgical interest. State societies are organized in 36 of the commonwealths, and at the present rate of increase these bodies will in a few years exist in every State. To these may be added 150 local societies of various kinds. In the United States homœopathic physicians are in charge of 220 hospitals, general and special, 66 other institutions— asylums, homes, etc., and 65 dispensaries, 20 medical colleges, and 32 medical journals.

The exact number of physicians practising homœopathy in this country cannot be ascertained with accuracy, but it is known to be not less than 12,000, and has been estimated as high as 18,000. The number of people employing these physicians, regularly or irregularly, cannot be less than 15,000,000. Thus has the influence of homœopathy extended during its American career of 75 years.

The influence of homœopathy upon public and professional sentiment has been beneficent and pronounced. Laymen and physicians have alike learned from the practice, that large quantities of potent and dangerous drugs are not often necessary to determine recovery from disease, and physicians have reached the wise conclusion that cures sometimes occur under the influence of small doses, as well as quantities with larger.

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Homölogy, a principle first enunciated by E. Geoffrey St. Hilaire. It is the anatomical or morphological identity of parts or organs, which may have entirely different functions. Thus the wing of a bird is homologous with the fore limb of a dog or the arm of man. On the other hand analogy involves the idea of physiological identity, or use. Thus the wing of a bird is analogous to the wing of an insect. Homologous organs are also present in groups of animals which have had a common origin; thus the swimming-bladder of a fish has given origin to the lungs of the higher vertebrates, the physiological differences arising from change of function. See ANATOMY, COMPARATIVE; ANALOGY.

HOMOIOUSIAN—HONDURAS

Homoousian, hō-mō-oo'si'an (Greek *homo-*, "the same," and *ousia*, "substance") and **Homoiousian** (Greek *homoios*, "like," and *ousia*, "substance"). The Council of Nice adopted the word homoousian to express that the Son was of the same substance with the Father, while the followers of Arius adopted the term homoi-ousian, as a sort of middle and reconciling theory, to express that the Son, though not of the same, was yet of a similar substance with the Father. The doctrine of Arianism was not only that the Son was subordinate to the Father, but that he was totally unlike him, being a mere created being.

Homoplasmy, hō'mō-plās-i, the effect of the influences of convergence (q.v.), upon homologous structures. The term was proposed by E. Ray Lankester and used at first with a rather broader meaning subsequently restricted and defined by Osborn. See ANALOGY.

Homop'tera. See HEMIPTERA.

Homs, hōms. See HEMS.

Hondo, hōn'dō (signifying "chief island"), the largest island of Japan (q.v.), for a long time erroneously known as Nippon or Niphon, the Japanese name for the whole empire.

Honduras, British, or **Belize**, a colony in Central America, bounded on the north and northwest by Yucatan (Mexico), on the east by the Caribbean Sea and Gulf of Honduras, and on the south and west by Guatemala. Its chief town, Belize, has 16,047 inhabitants. The Cockscomb Mountains in the southern district rise to the height of 3,700 feet. Principal rivers are the Old, the New, and the Sibun. The northern part of the colony contains many lagoons, and a chain of cays stretches along the coast. The forests yield mahogany and logwood in large quantities; cattle raising and the cultivation of coffee and fruits receive some attention. The value of exports since 1897 has been decidedly greater than that of imports. During the fiscal year 1908-09 exports reached \$2,287,000 in value; imports for the same period, \$2,682,000. In 1908 exports of mahogany amounted to 14,398,422 superficial feet; logwood, 5,775 tons. Registered shipping: 14 steamers and 278 sailing vessels. Vessels entering and clearing 1908, 507,443 tons. The total number of letters, books, postal cards, parcels, and newspapers transmitted by the post-office in 1908 was 471,728. That is to say, proportionately to the population, from 100 to 350 per cent more than in the neighboring Guatemala and Honduras. The standard of currency since 15 Oct. 1894 has been United States gold. In common use are silver coins and government notes. British Honduras is governed as a crown colony, by a governor, assisted by executive and legislative councils, the former composed of five members and the latter of eight. Expenditures since the close of 1899 have been less than the revenue, the latter being derived from customs duties, excise, land-tax, licenses, and the sale or leasing of lands. Total expenditure in the year ending 31 March 1909 about \$555,000; revenue, \$375,000; public debt, \$1,738,680. There are 42 primary schools, with 4,488 pupils, receiving aid from the government; also a few denominational secondary schools. Population, according to the latest census, 43,270, an increase of about 6.4 per cent since the previous census.

For origin and early history of the settlement, see BELIZE; also CENTRAL AMERICA.

Consult: 'Consolidated Laws of the Colony of British Honduras' (London 1887); Gibbs, 'History of British Honduras'; and Henderson, 'An Account of the British Settlement of Honduras.'

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Honduras, Gulf of, a spacious inlet of the Caribbean Sea, having on the west British Honduras, and on the south Guatemala and Honduras. In it several smaller bays of which the Gulf of Amatique, with its inner recess, the bay of St. Tomas, are spacious and deep. Several large rivers, the Belize, Chamelicon, Dulce, Motagua, and Ulua, flow into the gulf. Along the shores are the islands of Turneffe, Manabique, the Bay Islands including Ruatan, Utila, and Bonacca, and numerous islets and reefs called cays.

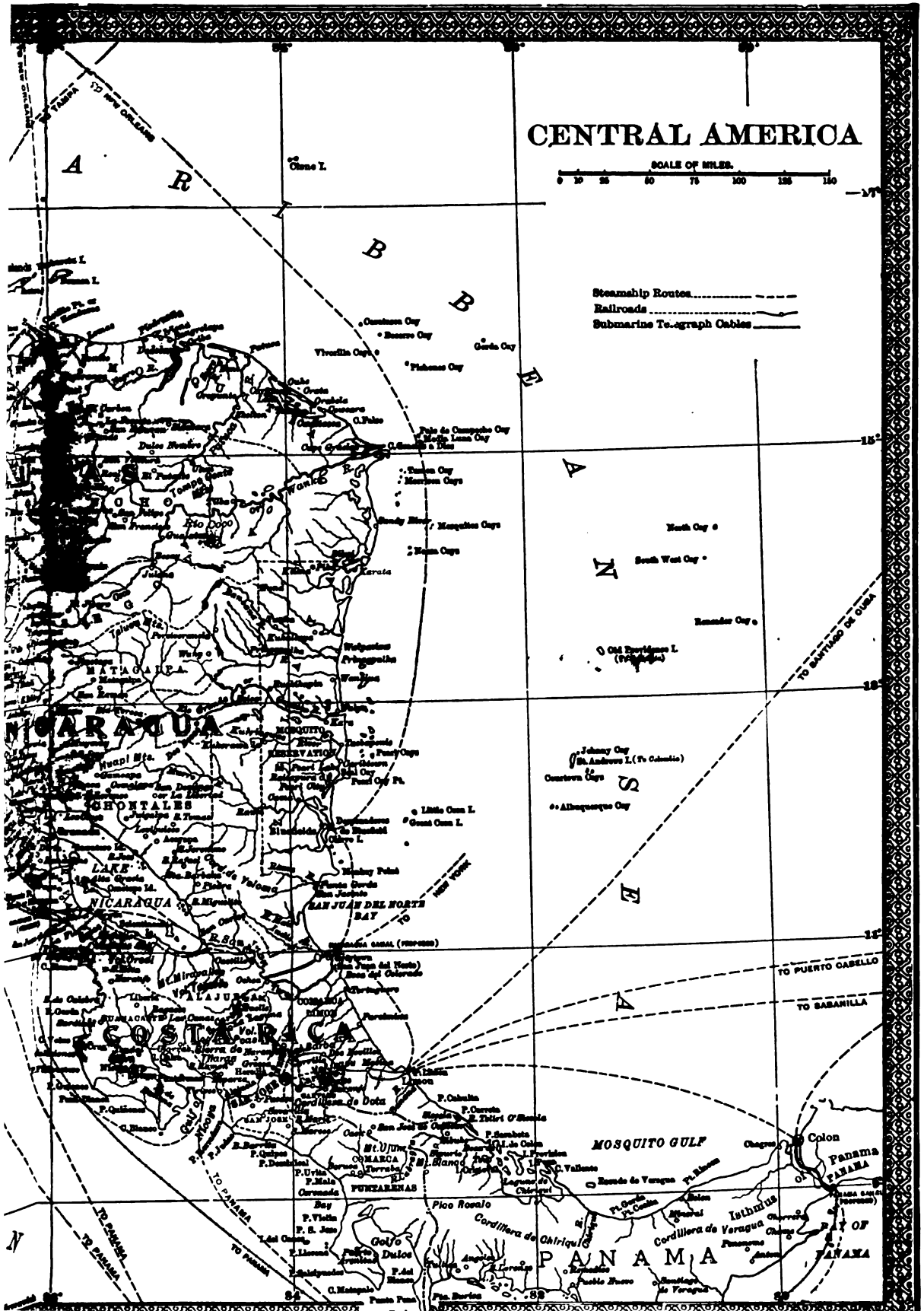
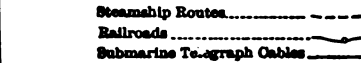
Honduras, Republic of, a country of Central America, bounded on the north and northeast by the Gulf of Honduras and the Caribbean Sea; on the southeast and south by Nicaragua; and on the southwest and west by Fonseca Bay, Salvador, and Guatemala. Estimated area, 46,250 to 46,400 square miles. The total population (1910) is 745,000; by the (latest) official statistics of 1901 the departments are as follows: Tegucigalpa, 81,800; Copán, 62,398; Gracias, 48,242; Choluteca, 45,340; Olanchó, 44,496; El Paraíso, 39,918; Santa Bárbara, 36,228; Valle, 33,450; Comayagua, 29,023; La Paz, 27,384; Intibucá, 26,348; Cortéz, 21,801; Yoro, 19,988; Colón, 13,791; Atlántida, 8,797; Bay Islands, 4,737. The capital, Tegucigalpa, has 35,000 inhabitants. Mountain ranges, which rise to heights of 5,000 or even 10,000 feet, are massed in the western half of the republic; the Juticalpa, Camasca, and Tompocente ranges, however, are near the frontier of Nicaragua in the east. Rivers emptying into the Caribbean Sea or Gulf of Honduras are the Coco or Wanks, and Patuca, in the east, and the Ulua, Chamelicon, etc., in the west. The Choluteca flows southward from the Misoco Mountains near Tegucigalpa, and empties into Fonseca Bay, on the Pacific coast. Large lakes are the Caratasca, on the Mosquito coast, and Yojoa, among the western mountains. The chief port on the Pacific is Amapala; other ports of entry are Puerto Cortez (on the Gulf of Honduras), La Ceiba, Truxillo, Roatan, and Iriona.

Minerals, Woods, and Agricultural Products.—Gold is found between the south and centre; silver in almost all sections. Lead, copper, salt-peter, iron, coal, platinum, zinc, and antimony are also widely distributed. The value of ores produced annually is approximately \$1,000,000 (that is 20,000 ounces of gold, 1,000,000 ounces of silver, and a considerable quantity of copper). Only about 5 per cent of the mines of the country are being worked. The forests from sea-level to an altitude of 1,000 feet, contain mahogany, ebony, dyewoods, sarsaparilla and other medicinal plants, and cabinet woods, cedar, etc. At an elevation of 1,800 feet are dense and very extensive forests of pine and similar woods. Agriculture receives more attention than formerly, and the leading product is the native maize, of which about 500,000 bushels are raised annually, chiefly in the departments of Copán, Gracias, and Santa Bárbara. Bananas and plan-

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A horizontal scale bar labeled "SCALE OF MILES." with tick marks and numbers at 0, 20, 40, 60, 75, 100, 125, and 140.



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HONDURAS

tainains are grown on 42,840 acres of territory in the departments of Cortéz, Atlántida, the Bay Islands, etc. The annual wheat crop is about 15,000 bushels; rice 4,000,000 pounds. Nearly 20,000 acres are devoted to the cultivation of plantains. Cocoanuts, lemons, and oranges are produced for export on a large scale. The coffee crop in 1909 amounted to 5,500,000 pounds, and tobacco to 1,500,000 pounds. Sugar-cane is cultivated on 13,263 acres; indigo on about 9,000 acres. The total value of agricultural products annually is about \$3,000,000. The number of cattle is estimated at 571,120; horses, 43,549; mules, about 14,000, etc. Large quantities of sarsaparilla (the product of the *smilar medica*) are exported to the United States.

Commerce and Manufactures.—The total value of imports in 1909 was 6,841,115 pesos, or about \$2,581,553 in United States currency; of exports, 5,275,094 pesos. Imports came chiefly from: the United States (60 per cent), Germany, Great Britain, Belize, Central America, and France. Exports were sent to: the United States (two thirds of total), Great Britain, Central America, Spain, and Germany, with comparatively small amounts to other countries. The trade report for the fiscal year ending Aug. 1 1909, shows the values of the principal articles exported to be as follows: Bananas, \$908,643; cyanide, \$536,544; cocoanuts, \$113,139; silver, \$100,668; coffee, \$57,920; hides, \$52,638, and cattle, \$47,601. Exports to the United States were valued at 64,690 pesos more than imports from that country. Native industries include the manufacture of cigars, flour, hats, and candles.

Railways, etc.—A contract for the completion of an interoceanic railway was entered into by an American syndicate in 1897; in 1902 the government's concession to the syndicate lapsed, but a prorogue was requested. The line from Puerto Cortéz runs southward to San Pedro and La Pimienta. Tegucigalpa is to be connected with the Pacific coast, at San Lorenzo, by a line which is now being constructed. Roads in the country, with a few exceptions, are mere mule-paths. A cart-road from the capital to San Lorenzo is completed as far as La Venta. There are 245 post-offices, and the number of letters (both internal and foreign correspondence) is not more than 1,250,000 in a year. The republic has 3,249 miles of telegraph wire; the capital and some other towns telephone services.

Money, Weights, Measures, and Banking.—The standard dollar, or silver *peso*, is worth about 40 cent, United States currency. Gold coins of the value of 20, 10, and 5 dollars, and silver pieces, fractions of one dollar, are also in circulation. While the metric system is authorized by law, the chief measures and weights in commercial use, as in the other countries of Central America, are: Centaro = 4.2631 gallons; fanega (dry) = 1.5745 bushels; libra = 1.043 pounds; and vara = 33.874 inches. Note also, manzaua = 15.6 acres, and arroba = 2¾-3½ gallons. The capital of the Bank of Honduras, 30 June 1902, was 600,000 pesos; bank-bills in circulation, 60,242 pesos.

Government, Finances, Army and Navy.—The president and vice-president of the republic, nominated and elected by vote of the people, serve for four years; the former is assisted by the ministers (chiefs of departments) of finance, interior, foreign relations, public works,

war, public instruction, and justice. The legislative body is composed of deputies elected by the people, there being one deputy for each 10,000 inhabitants. The budget for the fiscal year 1909 gives, as the total of receipts from all sources, 3,848,446 pesos, the largest items being, customs duties, 2,379,926 pesos; banana export tax 94,952 pesos; and ordinary expenditures, 3,822,234 pesos, to which must be added 409,048 pesos paid on the public debt, and 4,317,106 pesos on special accounts, making a total of 8,548,388 pesos. On the 1st of August 1908 the internal debt of Honduras amounted to 4,015,258 pesos. During the year 1908-9 this was increased 413,042 pesos, less 409,048 pesos. This last sum represents payments made on account of the debt. The net increase was therefore 3,095 pesos, making the total internal debt on 1 August 1909 4,019,253 pesos. The principal item of ordinary expenditures was 1,495,829 pesos, on account of the Department of War. The external debt on Honduras, of which a considerable portion is in dispute, amounts to about £22,500,000. Of this sum over £17,000,000 represents interest. A report of the Minister of War of the Republic of Honduras gives the total number of privates in the whole army at the close of 1909 was 45,576, the number of principal officers 955, and the number of subordinate officers 2,900. Honduras has two small vessels which serve as revenue cutters and war vessels. They carry a small armament of Hotchkiss guns.

Population, Education, and Religion.—The total number of inhabitants, as shown by departments in the first paragraph of this article, is 745,000, exclusive of forest tribes. Very few of this number are of Spanish descent, the great mass of the people being Indians or Mestizos. The Government is encouraging the spread of education, and to this end it recommends better salaries for teachers. A law school, a school of commerce, a national institute, and normal schools for both sexes are maintained, and the primary schools in 1909 numbered 655, with a corps of 767 teachers and 25,975 matriculates. Large sums of money have been spent by the administration for public instruction, mainly in the form of salaries to primary school-teachers. The Government intends to re-establish the school of medicine. Freedom of worship is secured by constitutional guaranty; the Government does not contribute to the support of any church; the prevailing religion is Roman Catholicism.

History.—The first place of debarkation of Christopher Columbus on the American mainland was near the present Cape Honduras, where he landed on Sunday, 14 Aug. 1502. On the following Wednesday Bartholomew Columbus landed at the mouth of Rio Tinto. They sailed thence along the coast to Cape Gracias á Dios (see CENTRAL AMERICA). The conquest of the country was effected by Hernan Cortés, who found the natives manageable, but their land "covered with awfully miry swamps," as he wrote to the Spanish emperor 3 Sept. 1526. "I can assure your majesty," he adds, "that even on the tops of the hills our horses, led as they were by hand, and without their riders, sank to their girths in the mire." The most important fact in the history of Honduras—the fact that the Indians remained in possession of so large a portion of the country that their descendants

constitute the bulk of the population to-day—is a consequence of the policy observed by Cortés and his successors. The natives were tractable; without their assistance it would have been impossible to move about among the dense forests, swamps, and mountains; therefore the Spaniards realized that more was to be accomplished by diplomacy than by force. Massacres occurred, but extermination was not attempted; on the contrary, Honduras became in time a nation of Spanish-speaking Indians, those of pure or nearly pure blood being more numerous now than before the conquest. For the era of independence, confederation with the neighboring states, etc., see CENTRAL AMERICA.

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Authority on Spanish America.

Hone, hōn, Philip, American merchant: b. New York 1781; d. there 4 May 1851. He was a successful auctioneer in New York, established there the first savings bank (1816), was mayor in 1826, and one of the founders of the Mercantile Library Association. Prominent in national political affairs, he aided in the formation of the Whig party. His diary, a portion of which, edited by Tuckerman, appeared in 1880, contains important side-lights on the early history of the Whigs. Hone was also at one time naval officer of New York port.

Hone, a strop or stone for sharpening knives and razors. See WHETSTONE.

Honesdale, hōnz'dāl, Pa., borough, county-seat of Wayne County; on the Lackawaxen River; the Erie, and the Delaware & H. R.R.'s; about 15 miles northeast of Carbondale and 30 miles northeast of Scranton. The first locomotive used in America, the "Stourbridge Lion," made its trial trip from this city. It is situated in a coal-mining region, with good farming land in the valleys. Its manufactures are silk and woolen goods, boots, and shoes, machine-shop and foundry products, axes, electric elevators, green, cut, engraved, and decorated glassware, men's clothing, and wheels for polishing glass. Large quantities of coal are shipped annually from Honesdale. Pop. 3,100.

Honesty. A flowering herb. See SATIN-FLOWER.

Honey, a sweet sticky liquid obtained by bees and other insects from flowers (see HONEY-BEE; and FLOWERS AND INSECTS) as food, or taken home to be stored as food for the young. The care with which the honey-bee (q.v.) collects and stores this substance in its hive has led to bee-culture (q.v.). Honey is highly nutritive, especially as a fuel for the energies of the body, as four fifths of its components are carbohydrates, the remainder being water with a trifle of protein. The saccharine elements are mainly grape-sugar and some fruit-sugar, which are so readily affected by yeast that various fermented drinks are made with honey as their

basis, of which the best known are the mead and metheglin in great demand among all Teutonic peoples a thousand years ago, and the equivalents of which are still made in Russia, Abyssinia and elsewhere. Before the general manufacture and use of cane-sugar, honey was largely depended upon for purposes of sweetening, and was put into a great number of cakes and confections now rare or only locally manufactured. Of the place which it took among the ancients in the household, in ceremonials, worship, and folk-lore a large amount of curious information may be gathered from such books as Beckman's 'History of Invention' (1846); Dutt's 'Materia Medica of the Hindoos' (1877), and similar works, of which lists may be found in Warring's 'Bibliography of Therapeutics' (1868), and in the 'Catalogue of the United States Army Medical Museum.' The importance of honey was, indeed, much greater to the ancients than to us; as might be inferred from its frequent mention in the Bible as a sign of abundance or the resource of the destitute. It has well-recognized medicinal properties, especially as a demulcent against hoarseness, catarrh, etc., in promoting expectoration in disorders of the breast, and as an ingredient in cooling and detergent gargles. Its effect is usually laxative also. It is used to sweeten certain medicines; and is sometimes mixed with vinegar in the proportion of two pounds of clarified honey to one pint of the acetic acid, boiled down to a proper consistence over a slow fire, and thus forms the oxymel simple of the shops. It enters into the composition of various sweetmeats, especially in the East, such as the genuine Oriental nougat. These properties and the flavor and color of honey vary with the qualities of the flowers from which it is made. Thus in Europe the white Narbonne honey of France, is said to owe its peculiar and delicious flavor to the rosemary and other labiate flowers on which the bees feed. The Grecian honey also stands in high estimation. Mt. Hymettus in Attica has been famous since classic times for this product; but that yielded by the bees who range the thyme-covered hills of Corinth is said to excel it. Another famous ancient source of supply was Sicily, especially about Mt. Hybla; and Corsica is yet celebrated for its honey and wax, which in ancient times were the chief exports of that island. In the eastern United States the early light-colored honey obtained from the blossoms of the white clover, is especially esteemed; also that derived from raspberry plantations, bass-wood flowers and the like; while that made later in the summer from buckwheat is in favor among darker varieties. California is an extensive producer of honey from various flowers.

As the aromatic agreeable flavors and healthful qualities of special flowers (fortunately in the majority) are kept and apparent in ordinary good honey, so certain bad qualities are retained and spoil some honey, which thereby becomes deleterious to the human system, acting as a nauseant, a purgative, affecting the nerve-centres or even seriously poisoning those who eat it. This is the case in the United States with honey made from the flowers of the mountain laurel (*Kalmia*) and some other toxic plants. Some persons are unable to eat any

HONEY ANT—HONEY-BEE

kind of honey, without disarrangement of the digestion or nerves, or both; and all should use it in moderation.

The industry of bee-keeping is for the purpose of supplying the market demand for honey. Modern hives are so constructed that the bees build separate combs each filling a box with glass sides, which are taken out and sent to market as the bees finish them. Another method of marketing is in the form of "strained" honey, the liquid pressed from the comb after warming, through sieves of linen cloth, or by other means. There is no reason why this should not be as good as that left in the comb, if properly prepared and preserved, and it permits of saving the material of the combs for wax (q.v.); but it makes possible adulteration, which is freely taken advantage of. The chief adulterant is commercial glucose, which occasionally is substituted to the extent of three fourths of the volume, leaving only enough real honey to flavor the mass. As glucose (grape-sugar) is a large constituent of this substance in nature no great harm results (when the glucose is good), beyond the deception; and wholly artificial honey has been largely sold in the past as the product of bees.

The United States is probably the greatest honey-producing region of the globe, and exports a vast quantity to Europe annually. The latest census reports 4,149,426 swarms of bees, valued at \$10,186,513; and the annual production of honey at 61,196,160 pounds, which, together with 1,765,315 pounds of wax was worth \$6,664,904.

Honey Ant, a true ant of the family *Formicidae*, fifth sub-family *Camponotinae*, and allied to the typical ants (*Formica*). The honey ant (*Myrmecocystus melliger*), is so called from certain of the wingless individuals being so many honey-pots, their abdomens being distended with honey fed to them by the normal workers, including both dwarfs and majors. It occurs from central Colorado (Garden of the Gods) to New Mexico and as far south as the city of Mexico. It erects mounds six or seven inches across and two or three inches in height, of the shape of a truncated cone. In the interior is the "honey chamber" or a rough dome-roofed vault or fissure, the honey-bearers (600 in a large colony) clinging by their feet to the roof. Their yellow bodies are stretched along the ceiling, their swollen, round, amber-colored abdomens of the size of currants hanging down. The "honey" is obtained in the night time by the workers which go in long processions to some distant scrub-oak bearing nectar-producing galls. The workers return with distended abdomens, and feed the honey-bearers with the nectar. C. McCook thinks the honey-bearers are not a distinct caste, but simply workers "with an overgrown abdomen." The honey is thus stored, as bees store their honey, for food in winter or times of famine. Consult McCook, 'The Honey Ants of the Garden of the Gods,' etc. (Philadelphia 1882).

Honey-badger, a small mustiline burrowing animal (*Mellivora indica*) of India, which eats insects, frogs, birds' eggs, and small animals generally, and is fond of honey. The natives believe it robs graves, but destruction of poul-

try is its worst sin. It is nearly related to the South African ratel.

Honey-ball, or **Globe-flower**, the flower of an American shrub (*Cephalanthus occidentalis*) of the madder family, which grows in wet places, where it is called button or river bush, and bears extremely fragrant flowers whose small florets are folded or packed into balls, while "the long styles and capitate stigmas remind us of pins stuck in a cushion."

Honey Bear, the sun-bear (q.v.).

Honey-bee. Bees in general are *Hymenoptera*, of the family *Apidae*. Bees are distinguished from wasps and other hymenoptera in the first place by the long, broad, flattened basal joint of the hind tarsus, which is adapted for carrying pollen to the nest. Bees are also more hairy than others of their order, and some of the hairs are plumose or feathery. The mouth-appendages are long and highly specialized, especially the long flexible proboscis or tongue (hypopharynx). There are no wingless adult forms. While the more primitive genera are solitary, in the more specialized or social kinds, besides the males and females, there are workers, which are, as a rule, sterile females in which the ovaries are undeveloped. Of the bee family there are now known to be about 150 genera and 1,500 species.

Original Home of the Honey-bee.—Although the honey-bee (*Apis mellifica*) has followed the white man in his migrations from the Old World to the New, and to Australia, New Zealand, etc., its original birthplace is in southern Asia, probably including the eastern shores of the Mediterranean Sea. Besides *A. mellifica* there are seven or eight other species, all except one southern and eastern Asiatic, including the islands of Timor and Celebes; the exceptional one (*A. adamsoni*) inhabiting tropical Africa and Madagascar. We know little of the honey-bees of China and Japan.

Like other domestic animals (and the honey-bee is the only domestic insect we possess), this bee is divided into races of which the Ligurian bee (variety *ligustica*), originally inhabiting Italy and adjoining regions, is a well-marked one, and another is the Egyptian honey-bee (variety *fasciata*). There are several sub-varieties of the northern form of *A. mellifica* in Germany. The English naturalist Ray, who published before Linné gave the name *A. domestica* to the northern dark form, our common honey-bee. This dark, northern form is the one which has been carried by the European race to various parts of the world, in some of which it is now wild. It occurs in the West Indies, in North America, including Mexico, in central and southern Africa, and in Australia and New Zealand. The variety *ligustica* has also been found at the Cape of Good Hope.

Besides the honey-bee there are other social forms in Central and South America, as well as other tropical countries, including Australia, which store up honey; these are small bees, exceedingly numerous in individuals, which belong to the genera *Melipona* and *Trigona*, and are stingless, though the sting exists in a rudimentary state. *Trigona mosquito* is known to send off swarms and to have but a single queen in a colony. The nests are built in hollow trunks of trees, in banks of clay or earth, and they gather pollen, nectar, and resin. On the

HONEY-BEE

whole, the honey-bee stands at the head of the hymenopterous series, and, in fact, at the head of the class of insects, though the house-fly is in some respects more extremely specialized.

Structure of the Honey-bee.—Besides the males or drones, and the female or queen, the colony consists of workers; these carry on the work of the society, gathering nectar, pollen, building the cells and feeding the young. The colony is permanent, differing in this respect from that of bumblebees, which come to an end each autumn. We will first describe the chief points in the external anatomy of the insect. The body is divided into three regions, the head, thorax, and abdomen. The eyes are of two kinds, simple and compound, the male differing from the queen and the workers in the large compound eye meeting in the middle of the top of the head. The mouth-appendages consist of three pairs,—first the jaws or mandibles; these in the queen and drone are notched, but in the worker the edge is entire and serves for biting, and in comb-building for thinning out wax shreds, also for scooping and molding the wax, while the next pair of appendages, or accessory jaws, are called maxillæ, and are used as a trowel. In the bumblebee the maxillæ are also used for piercing the corolla of flowers like the wistaria and honeysuckle, but those of the honey-bee appear to be too weak for this purpose. They also ensheathe the proboscis. The so-called tongue (ligula, lingua or hypopharynx) is the long, slender, hairy appendage adapted for gathering the nectar of flowers. It is an outgrowth of the under lips (labium or fused second maxillæ), is situated in a tube formed by the maxillæ and labial palpi, and can be partially withdrawn into the mentum, or base of the under lip. It can move up and down in the tube thus formed. It is covered by a hairy sheath, and is very elastic, this being due to a rod extending through its centre, enabling it to be used as a lapping tongue. Cheshire states that the rod on the under side has a gutter or trough-like hollow, which forms a false tube by the intercrossing of black hairs. There are also two side-ducts, which extend along to the end of the tongue, where the "spoon" or "bouton" is situated. This is provided with very delicate split hairs, "capable of brushing up the most minute quantity of nectar, which by capillarity is at once transferred by the gathering hairs to two side groove-like furrows at the back of the bouton." The central duct, because of its smaller size and consequent greater capillary attraction, receives the nectar, if insufficient in quantity to fill the side ducts. "But," says Cheshire, "good honey-yielding plants would bring both centre and side into requisition. The nectar is sucked up until it reaches the paraglossæ, which are plate-like in front, but membranous extensions, like small aprons, behind; and by these the nectar reaches the front of the tongue, to be swallowed as before described. The process of gathering the nectar is not exactly either a sucking or a licking process; but, as Cheshire shows, the action is primarily due to capillary attraction.

Organs of Smell and Taste.—Bees are guided to flowers chiefly by smell, rather than by the color of the flowers they visit. (See FLOWERS AND INSECTS.) The olfactory organs are multitudes of microscopic pits in the antennæ—the organs of smell. The sense of

taste is lodged in a minute soft baggy fold on the under side of the upper lip, which is rich in taste-cups; and, besides, there are a few taste-papillæ or cups found by Packard at the base of the paraglossæ and on the base of the labial palpi. These sites of the gustatory organs are situated where the food or nectar will come in contact in passing down the throat into the stomach.

Formation of Honey and the Honey-Stomach.—In insects there is the fore stomach (proventriculus) and the true or chyle-stomach. The former is called by apiarians the "honey-sac" or "honey-stomach." "If," says Cheshire, "it be carefully removed from a freshly killed bee, its calyx-like 'stomach-mouth' may be seen to gape open and shut with a rapid snapping movement." The entrance to the stomach is guarded by four valves, which open to allow the passage of food from the honey-sac to the chyle-stomach. It is closed at will by circular muscles. Thus the bee can carry food for a week's necessities, either using it rapidly in the production of wax, or eking it out if the weather is unfavorable for the gathering of a new store. By means of a complicated mechanism a bee in sucking up from composite and other flowers nectar together with much pollen (1) can either eat or drink from the mixed diet she carries, gulping down the pollen in pellets, or swallowing the nectar as her necessities demand; (2) when the collected pollen is driven into the chyle-stomach, the tube-extension prevents the pellets forming into plug-like masses just below, for by its action these pellets are delivered into the midst of the fluids of the stomach to be at once broken up and digested; (3) "while the little gatherer," says Cheshire, "is flying from flower to flower, her stomach-mouth is busy in separating pollen from nectar, so that the latter may be less liable to fermentation and better suited to winter consumption. She, in fact, carries with her, and at once puts into operation, the most ancient, and yet the most perfect and beautiful, of all honey-strainers."

How the Honey is Made.—Honey is made of nectar, and is due to a chemical change in the honey-sac. The bee gathers the nectar with its "tongue," swallows it; it then passes into the honey-sac, and is regurgitated as honey. The nectar when gathered is almost entirely pure saccharose, and, according to Bertrand, when regurgitated it is found to consist of dextrose and levulose; this change appears to be practically the conversion of cane-sugar into grape-sugar. A little salivary fluid is poured out into the mouth as the bee sucks the nectar, and this effects the chemical change. Cheshire thinks that the salivary fluid is added while the nectar is being sucked, and is passing over the middle parts of the under lip, so that the nectar may be honey when swallowed by the bee.

Many and probably all bees eat the pollen while gathering it. The plumose hairs of bees are of use in collecting the pollen grains which adhere to them, but the exact method of accumulation of the pollen and the mechanism of its conveyance from hair to hair till it reaches the part of the body it must attain in order to be removed for packing in the cells, is not fully understood, but the head and front legs scratch up the pollen-grains, and the honey-bee has a pollen-basket on each hind leg, the basal joint of the tarsus being broad and slightly hollow,

HONEY-BIRD — HONEY-DEW

with nine rows of short hairs to which the pollen-grains adhere.

Life History and Social Life.—In founding a new colony the young swarms consist of a queen-bee and a number of workers, a surplus population of the old colony. The swarming is not a nuptial flight, but an act of emigration. After the new swarm has been housed, the workers begin their labors by secreting wax. This is formed in glands on the inside of the ventral plates of the abdominal segments, appearing outside as thin projecting plates, which are removed by the wax-pincers on the hind legs; after being molded by the jaws they form the hexagonal cells in which the young or larvæ live and the food is stored, and thus the comb is gradually built up. The queen then lays an egg in each cell, and the larvæ (grubs) on hatching are fed by the workers. This they do by eating honey and pollen, which is formed in the digestive organs, into a kind of pap. This pap looks like arrowroot made with water, and the very young grubs partly float in it, besides absorbing it by the mouth. The young grubs, as they increase in size, are weaned from this glandular secretion or pap, pollen, honey and water being added, while the pap or glandular secretion is gradually withdrawn. The queen larvæ, according to Cheshire, is not weaned, but the secretion or pap (the so-called "royal jelly"), which is a rich, highly nitrogenous food, is added unstintingly to the end, and owing to this the queen becomes larger and fertile. When the colony is progressing well and young bees emerge, these act as nurses, the old ones going out of the hive to forage. When the grub is full-sized the worker bees seal up the cell with a cover made of pollen and wax, but pervious to the air. In this cell the grub spins a cocoon in which it pupates, finally biting its way out; the bee developing in three weeks from the time the egg is laid.

The new queen arises from an egg laid in the royal cell, which is large and slipper-shaped. She develops in 16 days. Only one queen is allowed in the hive at one time. The males (drones) arise from unfertilized eggs. The drone cells are a little larger than the ordinary worker cells. A drone is developed in about 24 days. When a swarm leaves the hive the old queen quits with it, but when a second swarm goes off from a hive it is accompanied by a young queen, who is frequently and perhaps usually, unfertilized.

The young queens will usually mate when five to seven days old, flying from the hive for this purpose. In a day or two after mating the queen generally begins to deposit eggs, and is then ready for use in the hive or to be sent away as an "untested queen."

Bee-Culture.—Spring is the best season to start a hive or apiary. In April a good colony situated in the Central States ought to have brood in five or six combs. The Langstroth hive with its modern improvements is the best, and the novice should select those holding 10 to 12 frames in each story.

Swarming is the result of an abundant secretion of honey, and combs crowded with bees and brood, that is, overpopulation. Just before swarming there is a partial cessation of field-work, the workers clustering or loitering about the entrance to the hives. Suddenly those which happen to be in the hive at this time rush forth,

accompanied by the old queen, and cluster on some tree or shrub near by. Hiving the new swarm can be done after a little experience and the use of smoke. Swarming may be prevented by giving abundant room for the storage of honey early in the season, before, as Benton says, the bees get fairly into the swarming notion. The honey also should be frequently removed. Also the hives should be well ventilated and shaded in hot weather. To successfully winter bees the colony must have a good queen, and young workers, also good and abundant food. Those colonies having the most honey compactly stored in the brood department and close about the very centre when the last brood of young bees should emerge, are the ones which will winter best. A good substitute for honey is a syrup made of granulated sugar, to be fed early in autumn. The bees should be kept dry and warm, and there should be no manipulation out of season. (Benton.)

Diseases and Enemies.—Diarrhœa is due to sour or fermented honey, dampness, and chilling of the bees. Foul-brood is a germ-disease, occasioned by *Bacillus alvei*; it affects both the brood and the adult bees. Of insect enemies the caterpillar of the wax or bee-moth is the most destructive, but with care it can be kept out of well-regulated hives.

Agency of Bees in Cross-Fertilization of Plants.—A hive is an essential thing in an orchard, and were it not for the visits of bees the fruit in many cases would not set. Also in hothouses where cucumbers are raised, a small hive of bees is indispensable for fertilizing the flowers. See BEE-KEEPING; FLOWERS AND INSECTS.

Consult: Cheshire, 'Bees and Bee-Keeping' (2 vols., London 1886); Benton, 'The Honey Bee'; Bulletin No. 1, new series, U. S. Department of Agriculture, Division of Entomology, Washington, 1896, contains a list of the best books on bee-keeping.

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Honey-bird, or Honey-guide. See GUIDE-BIRDS.

Honey Bloom, one of the American species (*Apocynum androsaemifolium*), the "spreading dogbane" of the family *Apocynaceæ* (q.v.). It grows in fields and thickets all over temperate North America, and has the medicinal qualities characteristic of the family.

Honey-buzzards, a genus (*Pernis*) of Old World hawks, formerly called "perns," which subsist mainly on insects, especially burrowing wasps, and bees, with their young and food-stores, which they dig out of the ground.

Honey-creepers, a group of small warbler-like birds (the family *Certhiidae*) of gay plumage, numerous in the West Indies and neighboring lands, where they are known about gardens and plantations and admired for their agility in searching flowers for small insects, and their cheery notes. Among them are the "banana-birds" (q.v.).

Honey-dew, the sweet secretion of certain plants and insects. (1) Some trees in warm climates yield from their leaves in very warm moist weather a saccharine liquid which may fall in drops, or may form a sticky film over each leaf. This exudation, dried, is one form of

HONEY-EATER—HONGKONG

man. (2) Certain minute insects, chiefly plant-lice, leaf-hoppers, and related bugs, yield a sweetish secretion, sometimes so copiously as to bedew a whole tree, and even fall in drops, giving the phenomena called weeping trees. The usual cause in this case is the presence of a tree-hopper (*Proconia undata*). Honey-dew in both cases attracts insects in large numbers, who feed upon it or upon the lesser insects gathered to the feast: and these, in turn, attract larger predatory animals, as birds, lizards, etc. Moreover dust sticks to it, closing the pores of the leaves to the injury of the tree; and, still worse, the honey-dew forms a highly favorable culture-ground for the spores of smuts and other pernicious fungi.

Honey-eater, or Honey-sucker, any of various small and somewhat thrush-like long-billed birds of the family *Meliphagida*, which inhabit the Australian regions, and seem to feed upon the nectar of flowers. They do so to some extent, but mainly are in search of insects within the corolla, collecting them easily by means of a peculiar tongue, which is divided near the end into a sort of fringe. They also eat soft fruit, and spend much of their time hunting insects on the ground. Well-known examples are the soldier-bird, parson-bird, pimlico, friar-bird (q.v.) and others familiar in Australia and New Zealand.

Honey-guides. See GUIDE-BIRDS.

Honey Hill, Battle of. On the night of 28 Nov. 1864 Gen. Foster, commanding the Federal troops in the Department of the South, left Hilton Head, S. C., with 5,000 infantry, cavalry, and artillery, and about 500 sailors and marines, for Boyd's Neck on the south side of Broad River, the object of the movement being to cut the railroad connecting Savannah and Charleston, and otherwise co-operate with Sherman, who was marching to the coast. Owing to a thick fog many of the boats lost their way, and it was late in the afternoon of the 29th before the troops got ashore. Gen. Hatch was put in command, with orders to push forward and cut the railroad. Hatch marched immediately; the guides and maps proved worthless, and, after marching and countermarching the greater part of the night, he went into bivouac about 2 o'clock on the morning of the 30th. Information of Foster's appearance at Boyd's Neck was carried to Gen. Hardee at Savannah on the evening of the 29th, and next morning at 2 o'clock, the advance of G. W. Smith's Georgia militia arriving at Savannah, Hardee directed Smith to hasten it to Grahamsville Station on the Charleston & S. railroad. The station was reached at 8 A.M., and the men marched out on the road leading to Broad River landing, about three miles where, on the crest of the north bank of a small stream, a work for light guns had been thrown up and trenches for infantry prepared. These works were about 100 yards from the little stream, and upon Honey Hill, 10 or 12 feet above the water level. On the right of the battery of five guns was a dense forest, on the left an open pine wood. The ground in front was open. Preparations were completed by 10 o'clock, at which hour about 1,000 militia filled the trenches on the right and left of the battery. Early in his march Hatch encountered the Con-

federate outposts, drove them in, and, soon after 10 o'clock, came under fire of the guns. Hatch attempted a flanking movement, but failed, and made several direct assaults during the day, all of which were repulsed, and at dusk he began his retreat to Boyd's Neck. His loss was 711 killed and wounded, and 43 missing. During the action Smith was reinforced by the 47th Georgia, but at no time did he have more than 1,400 men. He lost 8 killed and 42 wounded. Consult 'Official Records,' Vol. XLIV.

E. A. CARMAN.

Honey-locust, or Honey-shucks. See LOCUST TREE.

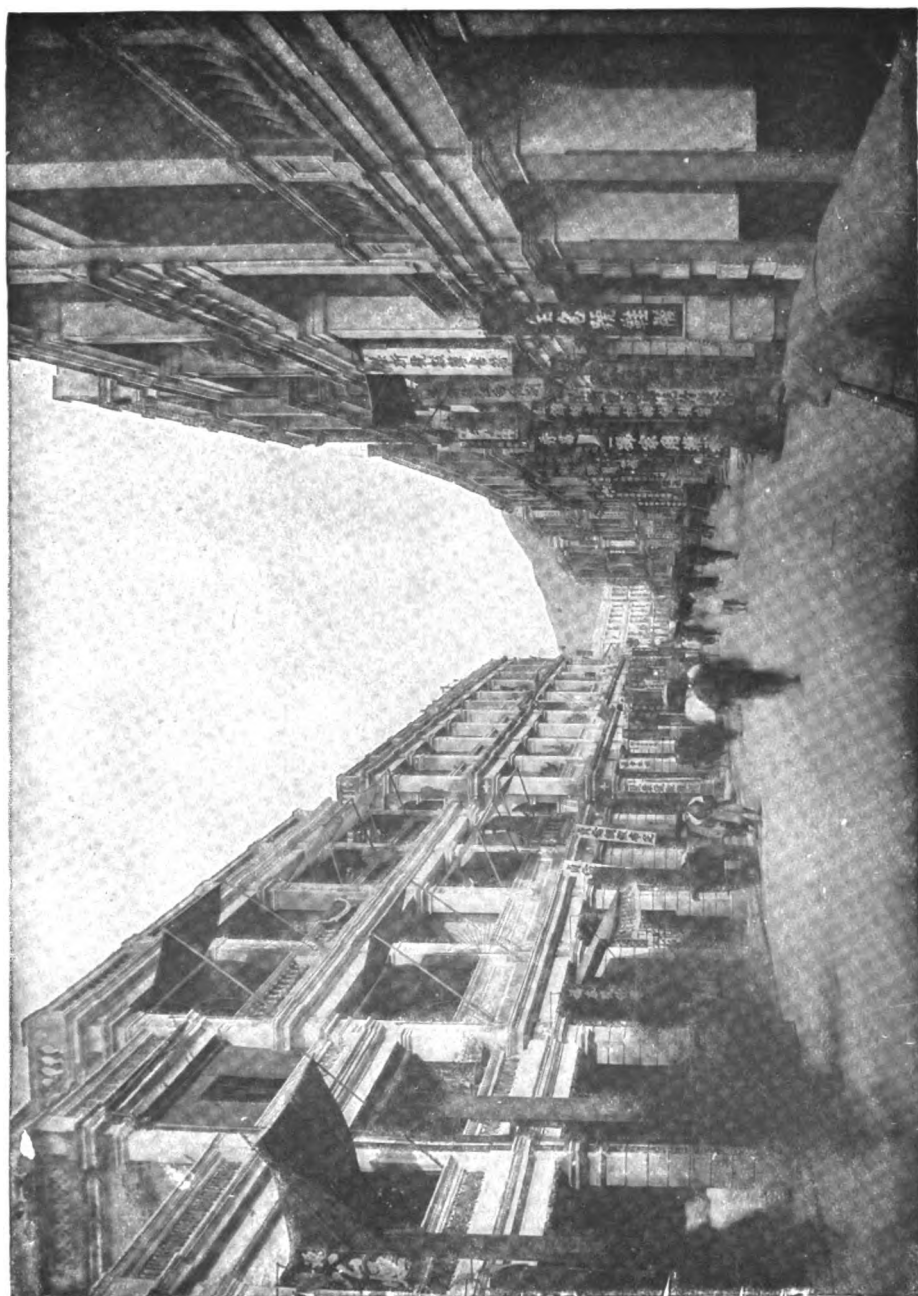
Honeysuckle, a genus of plants, *Lonicera*, belonging to the natural order *Caprifoliaceæ*. Upward of 100 species are native to the northern hemisphere. The honeysuckle family is represented in the North American flora by different species, among which are *L. sempervirens*, the trumpet honeysuckle; *L. grata*, American woodbine; *L. flava*, yellow honeysuckle, etc. "Coral honeysuckle" is another name in the United States for *L. sempervirens*. It is much valued in the South, where it is native, for its flowers of beautiful color and grateful perfume. In the eastern United States the Japanese honeysuckle has escaped from cultivation. The common honeysuckle, *L. periclymenum*, with distinct leaves and red berries, is indigenous in Great Britain; but two others have been naturalized, *L. caprifolium*, distinguished by its upper leaves being united (connate) and perfoliate, and by its smooth orange-colored berries; and *L. xylosteum*, an erect shrub, with small, yellowish, scentless flowers and scarlet berries. There are many other species in America, Europe, and Asia, and the name honeysuckle is often given to shrubs with sweet flowers of quite different genera.

Honey-sweet. See MEADOW-SWEET.

Hongkong, hōng'-kōng', or Hian-Kiang, hē'an-kē'āng (signifying "the place of sweet streams"), an island off the southeast coast of China, forming with Kau-lung on the mainland, a British crown colony and naval station. The island is on the east side of the estuary of the Chu-Kiang or Canton River, 90 miles south of Canton, and is separated from the mainland by the narrow Lyemun strait. About 10 miles long and about 7½ miles broad, the island is of rocky formation, attaining in Victoria Peak a maximum altitude of 1,809 feet. While almost treeless it is noted for its profuse flora. Good water is abundant. Hongkong is a great entrepôt for the foreign commerce of China, and Victoria (q.v.) the chief town and centre of its commerce is a free port. The foreign commerce is carried on mainly with Great Britain and Germany, whence considerable quantities of goods are imported, cottons being the principal item,—and to which tea, silks, hemp, etc., are exported.

Hongkong export, in vessels of European construction, goods to the value of about \$4,000,000, besides \$2,500,000 worth of goods in transit, making a total of \$6,500,000, and showing an increase over the previous years.

Comparing 1902 with 1901 the number of steamships which entered the port of Hongkong and their classification by the flags they carried, is as follows:



QUEEN STREET, HONGKONG.
—GALLERY OF THE PHILADELPHIA COMMERCIAL MUSEUMS.

Univ. Library, UC Santa Cruz 2001

HONOLULU

FLAG	Ships		Total Tonnage	
	1901	1902	1901	1902
British	321	324	2,894,519	2,965,030
German	122	123	1,242,499	1,360,524
Japanese	65	56	692,981	865,400
Norwegian	3	3	78,004	263,379
French	22	27	209,094	219,111
Chinese	4	17	3,349	163,396
Austrian	20	20	128,483	125,929
American	19	23	130,476	121,939
Others	33	37	119,498	131,518
Totals	609	630	5,498,903	6,216,226

In 1908, 22,740 vessels representing 11,164,386 tons entered; and 22,697 (11,142,731 tons) cleared.

The currency is chiefly in silver dollars. The revenue of the government is derived from land rents, licenses to sell opium, spirits, etc., taxes, postage, office fees, fines, etc. The colony's prosperity is due chiefly to the presence of large numbers of Chinese engaged in trade or in working building stone, one of the island's principal products. Exclusive of the naval and military establishments which numbered 5,597 and 7,640 respectively, the population (1908) was 329,560, of which 316,396 were Chinese and one third of these by birth, British subjects. Hongkong was ceded to Great Britain in 1842; some 376 square miles on the mainland, with 200,000 Chinese inhabitants, were leased in 1898.

Honolulu, Hawaii, capital and principal city of the Hawaiian Islands (now a United States Territory), and commercial metropolis of Polynesia; the business heart of the central Pacific. It is 2,080 miles southwest of San Francisco, in lat. 21° 17' 56" N., lon. 157° 51' 48" W. It lies on the southwest side of Oahu (the third island of the group in size, and northwest of Hawaii, with a safe harbor formed by a natural breakwater of coral reef, pierced by a broad opening. A fine lighthouse here throws a light visible for 25 miles. With its natural advantages, and the absence of rivals, the city occupies a unique position. From its central location it is a common point of touch for the three great trans-Pacific steamship routes—from the United States and British Columbia to New Zealand and Australia, from the same to Japan, China, and the Philippines, and from South America to Japan and China. Several independent steamship routes also run from it. It has regular communication with San Francisco, Vancouver, and Seattle, Peru, Auckland, and Sydney, New York and Boston, Yokohama and Hongkong, Liverpool, Glasgow, and Bremen, besides other places. The steamship line to Sydney touches at the Fijis; the line to Auckland, at Apia, Samoa. From Honolulu it is 3,850 miles to Auckland, about 4,000 to Sydney, and 3,445 to Yokohama. It is the port of foreign trade for the archipelago; hundreds of vessels and some \$20,000,000 worth of products pass in and out of it annually. There are numerous wharves and warehouses here and a government custom-house. (For the items of the trade, see HAWAII: the great items are sugar and molasses, rice, coffee, hides, and wool.)

Honolulu lies at the mouth of the valley of Nuuanu, which runs back between two high ridges to a pass between two peaks about 3,000 feet high in the great eastern range of moun-

tains; the view from the brink of the *pali* or precipice at this pass, is one of the notable sights of the neighborhood. The climate is mild and equable, and many sufferers from lung troubles in the United States seek it for a sanatorium. The extreme range of temperatures is 52° to 88°, average 70°. The rainfall is very irregular, but never slight; from 40 to 60 inches annually. The island is volcanic, the bordering reefs coral; hence the city streets are macadamized with coral and lava, porous rock making good surface drainage. The city is well laid out in American fashion, being indeed a modern American place; the old one-story wooden huts, mingled with grass huts among the trees, have mostly given place to cottages, unpretentious indeed, but neat and comfortable, and making parts of a beautiful and picturesque whole of luxuriant gardens and surroundings of tropical trees, with which also some of the streets are abundantly shaded—the great Norfolk pine, papaya, bread-fruit, mango, and monkey-pod, umbrella-tree, tamarind tree, algaroba, bamboo and koa, date and cocoa palms, candle-nut, royal-palm and poinciana regia, alligator-pear, china-rose bush, blooming all the year round, etc., many with rich and fantastic blossoms, others with great parasitic ferns, besides peach, oleander, banana, guava, orange, citron, and others. The flowers are also of great beauty and luxuriance.

The city has nearly 200 acres of public parks. There are all-modern appliances and services for civilized work and comfort; several first-class hotels, physicians, lawyers, daily and weekly newspapers, four banks and two theatres, insurance offices, several hospitals, a public library, etc. There are 22 public schools, including a high school and normal school, with a total attendance of over 4,000 pupils, besides 37 private schools, with an attendance of 2,700 pupils. There are a number of churches, Protestant and Catholic; the city is the seat of a Roman Catholic and an Anglican bishop. It is also the residence of the government officials, and the consular agents of many European powers. It has waterworks owned and operated by the Territorial government, and furnishing excellent water, pumped from artesian wells, supplemented by water from the adjoining valleys. Ice is made by machinery. There is an electric street lighting system operated by the government, and an electric street railway system, built and conducted by a chartered company; a telephone system; and there is a submarine cable to San Francisco and wireless telegraph to the neighboring islands. Of manufactures the number of different lines is upward of 30, of course chiefly for local needs; the largest branch is foundry and machine-shop manufacture, which is carried on in large works, and turns out some \$650,000 a year of product. Next to this is rice-milling, with some \$150,000 a year. Minor industries are ice, harness, leather, jewelry, soap, and shipbuilding. The total number of all employees in 1909 was 6,498, and the total salaries and wages paid \$2,795,000.

The chief building is the former royal palace, now the executive building, in the Italian style, finished in 1882. The judiciary and other government buildings are near it. The most interesting place is the museum, with many curious

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relics of early Hawaiian history, corals, and shells and other native curiosities, land and marine. The chief in interest and value is the great feather war-cloak of Kamehameha I., the founder of the monarchy, valued at \$150,000. This was the chief treasure of the former sovereignty, and was used as a mantle of state by the sovereigns. It was made of yellow feathers from the *mamo* bird, found only in the mountains, each bird furnishing only two small tufts of feathers for it, one from under each wing. It is four feet long, and has a spread at the bottom of 11½ feet. Nine generations were employed in making it.

Honolulu harbor was discovered by Capt. Brown in November 1794. The city as a modern foundation dates only from 1816, when John Young, an Englishman, and a faithful counsellor of the king, Kamehameha, advised its fortification. Previously it had been only a native village of huts, of little commercial importance. In 1820 it was made the capital of the archipelago, and afterward became the seat of government. Population (1870) 14,852; (1890) 22,907; (1900) 39,306; (1910) 52,183, showing a rapid increase since the annexation of Hawaii to the U. S. Of the population in 1900, 24,746 were males and 14,560 females; the total being divided as follows: 11,690 Hawaiians, 9,061 Chinese, 7,229 whites, 6,179 Japanese, 5,000 Portuguese, and 147 negro. Of these, 21,871 were born in Hawaii and 17,435 born in foreign countries. (This classification is based upon a census taken by the plague inspectors during the spring of 1900, and is believed to be approximately correct. Of the 7,229 whites about 2,000 are classed as foreigners.)

W. D. ALEXANDER,

Former Surveyor-General Hawaiian Islands.

Honor, Knights of, a secret, beneficiary order founded in 1873. In 1910, there were in the United States 34 grand lodges, 1,159 sub-lodges and 20,460 members. Since its organization the order has disbursed over \$95,000,000 in benefits, and in 1910 the amount was \$1,450,000. The order is incorporated under the laws of Missouri, with headquarters in St. Louis.

Honor, Knights and Ladies of, a fraternal, benevolent society founded in 1877 at Louisville, Ky. In 1910 there were 16 grand lodges, 1,300 sub-lodges, and 76,000 members. Since its organization over \$28,000,000 has been disbursed in benefits, and during 1910, the amount was \$1,565,000.

Honorius I., hō-nō'ri-ūs, Pope: d. 12 Oct. 638. He was elected pope in 625. In the hope of allaying a controversy he temporized with the leaders of the Monothelite heresy, which, while recognizing the twofold nature of Christ, declared he had but one will, a doctrine condemned by the sixth council of Constantinople. He was anathematized by the council that condemned the heresy. Pope Leo II., in confirming the acts of this council, says that Honorius was condemned for "not extinguishing the flames of incipient heresy." For a full account of the case of Honorius, consult Parson, 'Studies in Church History,' Vol I.

Honorius II., Pope: d. 14 Feb. 1130. He was elected pope in 1124, and was at the time of his election bishop of Velletri. A part of the bishops and cardinals had previously invest-

ed Cardinal Thibaut with the papal dignity; but both candidates having resigned Honorius was re-elected.

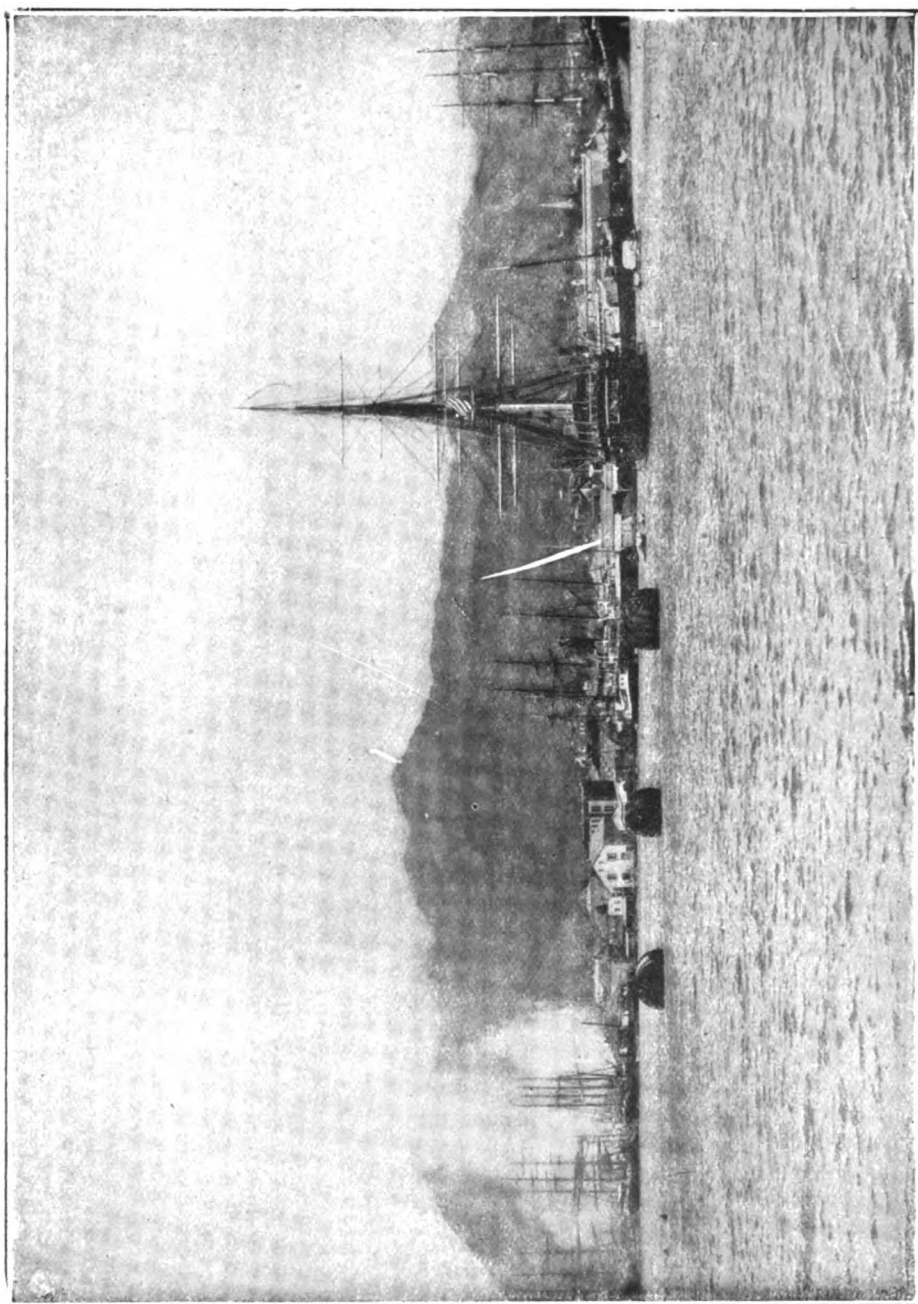
Honorius III., Pope: d. 18 March 1227. He became pope in 1216, on the death of Innocent III. He at once wrote to the King of Jerusalem to assure him of his support; to the bishops of France, to encourage pilgrims, and to the Emperor of Constantinople to promise him assistance. John, king of England, had left to his successor, Henry III., the burden of a war with the French Prince Louis, who laid claim to the English throne, and had been encouraged in his pretensions by Innocent. Honorius reconciled the barons with Henry, and obliged Louis to renounce his pretensions. He then turned his attention to the crusades, and crowned Frederick II. emperor of Germany, on condition that he would go to Palestine within two years. In France he instigated Philip Augustus and Louis VIII. to support the war against the Albigenses. He was succeeded by Gregory IX.

Honorius IV., Pope: d. 3 April 1287. He was elected pope in 1285, and supported the French king, Philip the Bold, in the war against Peter of Aragon.

Honorius, Flavius, Roman emperor, son of Theodosius the Great, b. Constantinople 9 Sept. 384 A.D.; d. Ravenna, Italy, 26 Aug. 423 A.D. On the death of his father in 395 the empire was divided into two parts, Honorius receiving the western half, with Rome as his capital. The principal events of his reign are the adoption of rigorous measures against paganism in 399; the devastation of Northern Italy by Alaric in 400-403; another irruption of barbarians under Rhadagaisus 405-6. Both invasions were repelled by his able minister Stilicho, who, however fell under the displeasure of his weak and indolent master, and was assassinated at Ravenna in 408. Taking advantage of the death of the defender of Rome, Alaric marched upon the city and plundered it in 410.

Hooch, or Hoogh, Pieter de, pé'tér dē hoon, or hōg, Dutch painter: b. Utrecht 1630; d. Amsterdam soon after 1677. His early art training was much influenced by Rembrandt. In 1655, he was enrolled in the Painters' Guild of Delft, where he resided, but later removed to Amsterdam. He was the chief representative of Dutch genre painting, and his specialty was the delineation of Dutch interiors, with their semi-darkness, suffused by the witchery of sunlight. Sometimes he set out two or more rooms in perspective, the vista of which was drawn and lit up with extraordinary skill.

Hood, John Bell, American soldier: b. Owingsville, Ky., 29 June 1831; d. New Orleans, La., 30 Aug. 1879. He was graduated at West Point in 1853, and bore a commission in the United States Army till 1861 when he joined the army of secession. The part he took in the Virginia campaign gained for him the rank of major-general, and at Gettysburg his division made a gallant record in its position at the extreme right of the Confederate line. He took part in the battle of Chickamauga on 19-20 Sept. 1863, having come to Tennessee to the support of General Bragg. When General Johnston was endeavoring in the spring of 1864 to impede Sherman's advance on Atlanta, Hood was a lieutenant-general in his army and his corps on



Courtesy of the Philadelphia Commercial Museum

THE HARBOR OF HONOLULU.

Univ. Library UC Santa Cruz 2001

HOOD

25 May 1864, was attacked by Hooker at New Hope Church. He succeeded Johnston the following July in the command of the Army of Tennessee, fought the battle of Peach Creek with Sherman 20 July 1864, but was compelled to retire behind the fortifications of Atlanta. After the battle of Jonesboro he retired from Atlanta, which was entered by Sherman. His attack on the forces under Schofield at Franklin being repulsed, he proceeded to Nashville, where he met General Thomas. Thomas advanced from his entrenchments on 15 December, and a two-days' battle ensued. Federal preparation had been carefully and deliberately made. A general attack on the afternoon of 16 December caused the entire Confederate line to give way. Soon Hood's army was in full retreat toward Franklin, the larger part of it "in great confusion," according to Hood's official report. After a nine-days' pursuit by the Federals, the remnant of the Confederates, now largely disintegrated, crossed the Tennessee. Hood, at his request, was relieved of his command. Subsequent to the war he was a commission merchant at New Orleans. He wrote 'Advance and Retreat: Personal Experiences in the United States and Confederate States Armies' (1880), and articles for 'Battles and Leaders of the Civil War' (1887). Consult these works; see also NASHVILLE, CAMPAIGN AND BATTLE OF.

Hood, Robin, English outlaw: said to have been b. 1160 and d. 1247. According to the popular account, with his followers, he inhabited Sherwood Forest, in Nottinghamshire, and also the woodlands of Barnsdale in the adjoining West Riding. They supported themselves by levying toll on the wealthy, and more especially on ecclesiastics, and by hunting the deer. The principal members of his band were his lieutenant Little John, his chaplain Friar Tuck, William Scadlock, George-a-Greene, Much the miller's son, and Maid Marian. His skill with the long-bow and quarter-staff was celebrated in tradition. What basis of fact there is for the story of Robin Hood is doubtful. Grimm maintained that he was one with the Teutonic god Woden. Other theories suppose him to have been a rebel yeoman in Lancaster's rebellion under Edward II.; a Saxon chief who defied the Normans; and a fugitive follower of Sir Simon de Montfort after the battle of Evesham. He figures prominently in Scott's novel 'Ivanhoe,' and in 'The Foresters,' a drama by Tennyson. The earliest known mention of him is in 'The Vision of Piers Plowman,' version B. (about 1377), in which Sloth says he knows 'rymes of Robin Hood.' 'The Gest of Robin Hood' (assigned to 1400), almost epic in length, consisting of 456 four-line stanzas, is the oldest extant ballad on this theme. Others of the more important ballads are 'Robin Hood and the Monk,' 'Robin Hood and Guy of Gisborne,' and 'Robin Hood's Death.' The remaining ballads are, in general, of inferior merit. It seems probable that there were what may be called a Sherwood cycle and a Barnsdale cycle, respectively. Many proverbs and sayings exist in connection with Robin Hood. Consult: Child, 'English and Scottish Ballads' (1883); Fricke, 'Die Robin Hood Balladen' (1883); and Ritson, 'Robin Hood' (new ed. 1885).

Hood, Samuel, VISCOUNT, British naval officer: b. Thorncombe, Devonshire, 12 Dec. 1724; d. Bath, Somersetshire, 27 Jan. 1816. He entered the navy in 1740, was promoted lieutenant in 1746, commander in 1754, and post-captain in 1756. While commanding the *Vestal* in 1759 he took the French *Bellona* after a three-hours' fight. From 1767 to 1771 he was commander-in-chief in North America. Having served as commissioner of the Portsmouth dockyard in 1778-80, he was made admiral of the blue in 1780, and almost immediately was sent in command of a squadron to reinforce Rodney on the North American and West Indian stations. He remained on that duty until the signing of the peace, and distinguished himself in several battles. Despatched in 1781 to blockade Martinique, he was intercepted by De Grasse and the French fleet, against which he fought in April and in July (under Admiral Graves). Again in the West Indies in 1782, after an absence along the North American coast, he outmaneuvered De Grasse in several minor contests, and later, on 12 April, took an important part in the victory of Dominica, when he led the rear of the British line. In 1784 he was elected to Parliament for Westminster, and in 1788 made a lord of the admiralty. He took command of the British fleet in the Mediterranean in 1793, and occupied Toulon. Hood had a great reputation as a tactician, and a high tribute was paid him by Nelson, who had been one of his subordinate officers. Consult James, 'The Naval History of Great Britain' (1822-4; new ed. 1837).

Hood, Thomas, English poet and humorist: b. London 23 May 1799; d. there 3 May 1845. In 1821 he became sub-editor of the 'London Magazine,' and from that time appears to have resolved on devoting himself entirely to a literary life. In 1826 he published 'Whims and Oddities.' This was followed by 'National Tales' in prose, and a volume of serious poetry, which, though favorably received, did not obtain much popularity. In 1830 he started the 'Comic Annual,' which, during the eight years of its existence, was made the vehicle of many of his most remarkable productions. At the same time his pen was diligently employed on other subjects, and he published the powerful poem called 'Eugene Aram's Dream,' 'Tylney Hall,' a novel, which, though defective in its plan and structure, abounds in fine strokes of wit and humor. His health had begun to fail, and in consequence he lived on the Continent 1835-40. He continued his 'Comic Annual' during his residence at Coblenz and Ostend, and in 1838 published 'Hood's Own.' His continental experiences also furnished materials for his 'Up the Rhine' (1839), a series of imaginary letters after the manner of Smollett's 'Humphrey Clinker.' The whimsical cuts inserted in the work, as well as its combination of good sense and humor, made it very popular. Shortly after his return, he undertook the editorship of the 'New Monthly Magazine,' and continued it until 1843. His principal contribution to it was the famous tragi-comic story in verse of 'Miss Kilmansegg.' His last periodical, entitled 'Hood's Magazine,' was commenced in 1844. It contains some of his best productions, though several of them were written after his health

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had completely given way, and while he was propped up by pillows in bed. Hood is unrivaled as a punster, and seems to have been almost equal master of the comic and the pathetic. In the latter style his 'Song of the Shirt' is universally known, and as a burst of poetry and indignation is not surpassed by anything in the English language.

Hood, Thomas, generally known as **TOM HOOD**, English miscellaneous writer; son of the preceding: b. at Wanstead, Essex, 19 Jan. 1835; d. Peckham Rye, Surrey, 20 Nov. 1874. He was educated at Oxford in 1853, with a view to a clerical career, but edited the 'Liskeard Gazette' in 1858-9, and from 1860 till 1865 was a clerk in the accountant-general's department at the War Office. In 1865 he became editor of the comic paper called 'Fun.' His first separate publication was 'Pen and Pencil Pictures' (1857), and among his subsequent works are: 'The Daughters of King Daher, and other Poems' (1861); 'Jingles and Jokes for the Little Folks' (1865); 'Captain Masters's Children' (1865), his best novel; 'A Golden Heart' (1867); 'The Rules of Rhyme: A Practical Guide to English Versification' (1869), a work which has gone through two later editions; 'From Nowhere to the North Pole' (1874). From 1867 he produced 'Tom Hood's Comic Annual.' A volume of his 'Favourite Poems,' with a memoir by his sister, Mrs. Broderip, was published in the United States in 1877.

Hood of Avalon, Arthur William Acland Hood, BARON, English naval officer: b. Somersetshire 14 July 1824; d. Glastonbury 15 Nov. 1901. After service on the coasts of Spain and of Syria, he was made lieutenant in 1846, and in 1854 commander in recognition of his services with the naval brigade before Sebastopol. Assigned to the China station, he participated in the capture of Canton (December 1857), and in 1858 received the commission of post-captain. In 1862-6 he was in command of the *Pylades* of the North American station, in 1866-9 of the *Excellent* and the Royal Naval College at Portsmouth, and in 1869-74 director of naval ordnance. He was promoted rear-admiral in 1876, was first sea lord of the admiralty in 1885-9, and became admiral in 1886. His attitude in connection with the development of the British navy was strongly conservative.

Hood, Mount, a peak of the Cascade Range, in the northern part of Wasco County, in Oregon. The height is usually given as over 11,225 feet, but the latest explorers claim it is nearly 12,000 feet. Mount Hood was at one time an active volcano; the lava is found on the slopes and some distance from its base.

Hood River, a name applied to a valley, town, and river in Wasco County, Oregon. The town is situated on the Columbia River and on the line of the Oregon Railway & Navigation Company, 66 miles east of Portland and 22 miles below The Dalles, the county-seat. The Hood River strawberry has acquired a reputation almost phenomenal, and is distributed over an immense area of country extending from Denver and Omaha on the south to Winnipeg in the province of Manitoba to the north and east. The output in 1903 was 150 carloads. The apple industry is also rapidly assuming

large proportions, grades of superior excellence are produced, and the highest priced Spitzenburgs and Yellow Newtown Pippins found in the markets of New York and London were grown in Hood River. The valley proper extends south from the Columbia River to Mount Hood, some 20 miles, and is protected and cradled by the Cascade range of mountains on the west and a high divide putting out from Mount Hood on the east. The amount of land adapted for fruit culture in this unique valley exceeds 50,000 acres. The river itself drains all of the north side of Mount Hood, has a large and constant flow of water, and for the last 10 miles of its course before entering the Columbia has an average fall of over 60 feet per mile, affording 10,000 measured horse-power per mile. There are immense forests of fir and cedar about the head-waters of this stream, and one of the largest saw-mills in the State is conveniently situated near its confluence with the Columbia. The climate is a happy mean between the moist section of western Oregon and the semi-arid plains of the Columbia. The scenery is grand in the extreme and yearly attracts the attention of many visitors. The town is pleasantly situated, overlooking the Columbia River, is supplied with electric lights, while the telephone is universally present in both town and country. It is, however, the superlative excellence of its fruits that has given Hood River a reputation almost world-wide. The population of town and valley (1910) is about 8,000.

E. L. SMITH.

Hooded Crow, a crow native in northern Europe (*Corvus cornix*), so termed in allusion to markings on the head. Head, wings, and fore parts are jet black, the rest of the bird ash-gray; bill and feet are black. It retires to the southward from its more northerly haunts at the time of the crow migration. In England it is known as the gray, dun, or Royston crow. The hooded crow found in India is similar in general appearance, but is a smaller species.

Hooded Seal, a large dark-gray spotted seal of the North Atlantic, closely related to the common harbor seal, and named *Cystophora cristata*. It reaches a length of about 10 feet, and is especially distinguished by a large inflatable sac upon the face, the expansion of which is thought to be a defensive device, calculated to terrify enemies. It is occasionally seen on ice-floes along the Labrador coast.

Hooded Warbler, a fly-catching warbler (*Sylvania mitrata*), common in the southern United States in summer and making its nest in low bushes. It is bright yellow except a solidly black crown, neck and breast, comparable to a hood, leaving the face golden yellow.

Hoodoo. See MASCOR.

Hoof, a toe-nail which is large, envelops the terminal phalange, and is of material assistance in walking, as in the case of horses, cattle and other ruminants, and in the elephant, rhinoceros, etc. It is most highly developed in the horse, where the whole terminal part of the foot is reduced to a single, well-booted toe. In split-hoofed or cloven-hoofed animals there are two toes approximately equal, and booted with hoofs flat on their inner sides and closely appressed. The small non-functional

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toes hanging behind the hock-joint in most split-hoofed animals are often called "false hoofs." Accidents and diseases affect the hoofs of domestic animals (see Foot-rot, etc.), and require careful attention, especially in the case of horses. The soundness of a horse's foot is mainly preserved by permitting it to grow uninjured by the rasp and knife, and kept clean by being washed with cold water; all other applications are injurious and destroy the toughness of the "horn surface." Softness and brittleness of the hoof, which are fruitful sources of cracks and corns, may be remedied by placing the feet for several hours daily in thick woolen swabs, kept cool and moist by frequent applications of cold water, and by encouraging a more healthy growth of horn by occasional mild blisters round the coronary band. Cracks (or sand-cracks) mostly occur among horses much upon the road, cause lameness, and constitute unsoundness. When serious and recent, poulticing, thinning away of the crust about the crack, and perfect rest are essential. After the earlier heat and tenderness are removed a hot iron should be drawn at right angles to the crack, both above and below, so as to separate the diseased from the sound horn. Waxed thread or fine wire should be wound round the hoof, and a sound growth of horn stimulated by a blister round the coronet.

Hooft, Pieter Corneliszoon, pē-tēr kor-nā-lēs-zōn hōft, Dutch poet and historian: b. Amsterdam 26 March 1581; d. The Hague 21 May 1647. He was son of that Cornelius Hooft who did much to procure Elizabeth's recall of the incompetent and tyrannical Leicester in 1587. He traveled through France, Italy, and Germany in 1601, and on his return began with patriotic ardor to improve and purge the speech of his mother country. With this aim in view he translated Tacitus into Dutch, and made that Latin writer the model of his style, as a historian. His historical writings are vivid and comprehensive. His poems are chiefly in the erotic vein. He also produced dramas in the form of pastoral, tragedy, and comedy. In his comedies the domestic life of the Netherlands is admirably portrayed. In the castle of Moritz, Prince of Orange, at Muiden, where he lived as high bailiff, he used to gather round him a coterie of brilliant men and women, and this intellectual circle famous as the "Muiderkring" included the poets Huygens, Vondel, and Baerle. His principal works are 'Hendrik (IV.) de Grote zijn leven en bedrijf' (1671); 'Nederlandsche Historien' (1656); the poems 'Minneliederen'; 'Afbeeldinglieden van Minne'; the pastoral drama 'Granida' (1605); the tragedies 'Geraerd van Velzen' (1813); and 'Baeto' (1616); and the comedy 'Warenar.'

Hook, Theodore Edward, English novelist and journalist: b. London 22 Sept. 1788; d. 24 Aug. 1841. For some years Hook led a life of gaiety in London, and became notorious for practical jokes and similar escapades. In 1812 he was appointed accountant-general and treasurer of the island of Mauritius; but, owing to his gross carelessness, a large deficiency in the military chest was discovered, and in 1818 he was sent home under arrest, but no proceedings were taken against him. From 1820 to 1841 he was editor of the 'John Bull,' and at intervals from 1824 to 1828 published his 'Sayings

and Doings,' while in 1836 he became editor of the 'New Monthly Magazine.' His other principal works are a series of novels, among which may be mentioned 'Love and Pride'; 'Jack Brag'; 'Gilbert Gurney'; 'Gurney Married.'

Hooker, huk'ēr, Edward, American sailor: b. Farmington, Conn., 1822; d. Brooklyn, N. Y., 1 May 1903. He followed the sea in the merchant service until the outbreak of the Civil War when he joined the United States navy as acting master, and served with distinguished bravery. He was commissioned as lieutenant-commander in the regular naval service in 1884 and full commander two years later, when he retired.

Hooker, Isabella Beecher, American philanthropist: b. Litchfield, Conn., 22 Feb. 1822; d. 25 Jan. 1907. She was a daughter of Dr. Lyman Beecher (q.v.) and in 1841 married Joseph Hooker, a lawyer. She made a special study of the right of women of the United States to vote; was active in various reform movements, and is known as a public speaker. She wrote 'Womanhood, Its Sanctities and Fidelities.'

Hooker, Joseph, American soldier: b. Hadley, Mass., 13 Nov. 1814; d. Garden City, N. Y., 31 Oct. 1879. He was graduated at West Point in 1837 and received a commission in the 1st artillery. He served in Florida and on the northeast frontier 1837-40 and during the Mexican War was aide to Generals Smith, Harmer, Butler and Pillow. He saw much service in both the northern and southern campaigns, and resigned from the army in 1853. From that date to the breaking out of the Civil War he was successively farmer, engineer and militia colonel. In 1861 he went to the front as a brigadier-general of volunteers. In 1862 he was commissioned major-general of volunteers and was present at the battle of Williamsburg, Va., and was subsequently conspicuous in the Peninsular campaign and in the battles of Bristoe Station and Chantilly. He also took part in the Maryland campaign, and in September of 1862 was appointed brigadier-general in the regular army. Two months later he was placed in command of the Fifth corps, and at the battle of Fredericksburg commanded the Third and Fifth corps. In 1863 he was put in command of the Army of the Potomac, but although very successful in refitting and reorganizing his troops, failed to show, as head of an army, those qualities which had characterized him in the field as corps and division commander. At Chancellorsville the defeat of the Federal troops by General Jackson was largely due to Hooker's vacillation and his want of power to cope with the sudden surprise of his right flank by the Confederate general.

In 1863 he was despatched in command of the Army of the Cumberland to reinforce Rosecrans at Chattanooga and distinguished himself on 24 November in the so-called "Battle among the Clouds" on Lookout Mountain. He was brevetted major-general in the regular army in 1865, and a paralytic stroke forced him to retire from active service with that rank in 1868.

An equestrian statue of General Joseph Hooker by the sculptor French, was unveiled on Beacon Hill, Boston, 25 June 1903, with imposing ceremonies. The day was made a State holiday.

Hooker, Sir Joseph Dalton, English botanist; son of Sir William Jackson Hooker (q.v.)

b. Halesworth, Suffolk, 30 June 1817. He was educated at the University of Glasgow, accompanied Sir James Clark Ross's Antarctic expedition of 1839-43 as assistant-surgeon and naturalist, and in 1847 published an account of its botanical results in two volumes, entitled 'The Botany of the Antarctic Voyage of H.M. Discovery Ships Erebus and Terror in the years 1839-43.' He went to India in 1847, in order to investigate the botany of part of the Himalayan region, and in 1854, three years after his return issued his 'Himalayan Journals, or Notes of a Naturalist in Bengal, the Sikkim and Nepal Himalayas, the Khasia Mountains,' etc. In his work on the 'Rhododendrons of the Sikkim Himalaya' (1849), he first introduced to the notice of European gardeners many splendid and now familiar species of these favorite shrubs. In 1871 he set sail for Morocco, and in May of that year he and his companions reached the summits of the Great Atlas, which till then had never been trodden by any European foot. A record of this journey is contained in the work written with John Ball, 'Journal of a Tour in Morocco and the Great Atlas' (1879). He traveled in the Rocky Mountains and California in 1877. In 1855 was appointed assistant to his father in the directorship of Kew Gardens, and on his father's death in 1865, succeeded him as director. He retired in 1885. He was president of the Royal Society during the five years 1873-8. Among his other works are: 'Introductory Essay to the Flora of New Zealand' (1853); 'Introductory Essay to the Flora of India' (1855); 'Flora Novæ Zealandæ' (1853-5); 'Flora of Tasmania' (1856-60); 'The Flora of Australia: its Origin, Affinities, Distribution, etc.' (1859); 'Genera Plantarum' (1862-83), with George Bentham, an epoch-making revision of the natural system of classification; 'The Student's Flora of the British Islands' (1870; new ed. 1883), an excellent and popular work; 'The Distribution of the North American Flora' (1878); and the great 'Flora of British India' (1875-97).

Hooker, Richard, English theologian: b. Heavitree, near Exeter, March 1554; d. Bishopsbourne, 2 Nov. 1600. He was educated at Oxford. In 1581 he took orders, and was shortly after made preacher at St. Paul's Cross, in London. In 1584 he became rector of Drayton Beauchamp, Buckinghamshire. The following year he was appointed by Archbishop Whitgift Master of the Temple for life. Here he became engaged in a controversy with his colleague Walter Travers, whose sympathies were strongly puritanical, and to this controversy we owe his celebrated work 'Of the Laws of Ecclesiastical Polity.' The first four books were printed in 1594. The fifth book of his great work appeared in 1597; the last three in 1600. 'The Ecclesiastical Polity' written in defense of the Church of England, is no less remarkable for learning and extent of research than for the richness and purity of its style, which entitles its author to be regarded as one of the classics of the Elizabethan age. See *Lives by Walton*, and *Keble*.

Hooker, Thomas, American colonial clergyman: b. Markfield, Leicestershire, England, probably 7 July 1586; d. Hartford, Conn., 7 July 1647. After being graduated at Cambridge he

took orders, preached in London, and was chosen lecturer at Chelmsford in 1626. Having been silenced by Laud for nonconformity, he established a grammar school, and about 1630 went to Holland, where he preached at Delft and Rotterdam. In 1633 he came to New England with Cotton and Stone, and was settled with the latter at Newtown, now Cambridge, being ordained by the brethren of the church. In 1636 he removed with about 100 others to what is now Hartford, Conn., where he and Stone were the first ministers of the church. He was a remarkably animated and able preacher, of commanding presence and earnest zeal, and he has been called the Luther of New England. It was his custom to preach without notes. Some 200 of his sermons were sent to England, where about half of them were published. His most celebrated work, 'A Survey of the Summe of Church Discipline,' written with John Cotton, was published in England (1648). Many of his works have gone through repeated editions. See Walker, 'Life of Hooker' (1891).

Hooker, Sir William Jackson, English botanist: b. Norwich 1785; d. 12 Aug. 1865. He applied himself to the study of botany at an early age, and in search of botanical specimens visited Scotland and the Scottish islands, France, Switzerland, and Iceland. His investigations on the British 'Jungermannia and Mosses' drew attention to his attainments, and he was elected to the chair of botany in the University of Glasgow, a position he filled for 20 years. In 1836 he was knighted, and in 1841 was appointed director of the Royal Gardens at Kew, a post which he held up to the time of his death. Under his management these gardens increased their area from 11 acres to 270. They are well laid out, and contain hot-houses and conservatories far superior to anything of the kind on the Continent, and include museums filled with objects derived from the vegetable kingdom, botanical libraries, and a most extensive and excellently arranged herbarium. Among his works may be mentioned 'Tour in Iceland' (1811); 'The British Flora'; 'Flora Boreali-Americana'; 'Illustrations of the Genera of Ferns, Icones Plantarum'; 'British Ferns'; etc.

Hooker, Mount, Canada, a peak in the Rocky Mountains; 15,600 feet high; near the eastern boundary of British Columbia.

Hoonoomaun, hoo'-noo-mān. See ENTEL-LUS MONKEY.

Hoop Ash. The black or water ash (*Fraxinus nigra*). See ASH.

Hooper, hūp'ér, John, English reformer and martyr: b. Somersetshire, about 1495; d. Gloucester 9 Feb. 1555. He embraced the principles of the Reformation and in 1539, to avoid the persecution consequent on refusing to sign the new articles of faith put forth by Henry VIII., withdrew to the Continent. On the accession of Edward VI., in 1547, he went to London, and contributed greatly to the progress of the Reformation. In 1550 he was nominated bishop of Gloucester. On the accession of Mary, in 1553, he was one of the first victims fixed upon, and being imprisoned in the Fleet, was treated with great severity. In 1555 he was required formally to recant his opinions. This he refused to do and was burned at the stake near his own cathedral. His works con-

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ist chiefly of a 'Godly Confession and Protestation of the Christian Faith'; 'Lectures on the Creed'; 'Sermons on the Book of Jonah'; 'Annotations on the Thirteenth Chapter of the Romans.'

Hooper, William, American patriot: one of the signers of the Declaration of Independence: b. Boston, Mass., 17 June 1742; d. Hillsboro, N. C., October 1790. He was graduated at Harvard College in 1760, studied law with James Otis in Boston, and removed permanently to Wilmington, N. C., in 1767, where he soon rose to professional eminence and was noted for his social qualities and hospitality. He was delegated to the Continental Congress in 1775, and was till his death a leader in the councils of North Carolina.

Hoopeston, hoops'ton, Ill., city in Vermilion County; on the Lake Erie & W. and the Chicago & E. I. R.R.'s.; about 85 miles south of Chicago and 48 miles south by east of Kankakee. It is situated in an agricultural region, and its chief industries are connected with agricultural products. It has large sweet-corn canning establishments, and factories for making the cans and the canning machinery. There are manufactured other canned goods, also horsehoe nails and agricultural implements. Grain and hay are shipped to the larger markets. The government, in accordance with the charter of 1877, is vested in a mayor who serves for two years and in a city council. The city owns and operates the waterworks. Pop. (1890) 1,911; (1910) 4,698.

Hooping-cough, a series of coughs ending in a long-drawn breath, during which a shrill whistling sound, the hoop, is produced. Several fits of coughing succeed one another, until some phlegm or mucus is expelled. Vomiting not infrequently follows a fit of coughing. It has recently been discovered that the cause of the complaint is a poison acting as an irritant on the pneumogastric nerve. Hooping-cough is contagious, and most commonly attacks children, generally but once in their lives. The first symptoms are a difficulty of breathing, and other slight febrile affections, which are succeeded by hoarseness, cough, and difficulty of expectoration. After a fortnight or more the cough becomes convulsive, and is attended by the hoop. In four or five weeks the expectoration becomes loose, and the fits of coughing gradually diminish in frequency and duration. Hooping-cough is seldom fatal to adults, but is most fatal in the first year of childhood. Bronchitis and pneumonia are the most serious complications.

Hoopoe, hoo'pō, a peculiar bird of the Old World, which takes both its vernacular and scientific name (*Upupa*) from its whooping cry. It is of the group *Coccygomorpha* (q.v.) and represents a family (*Upupidae*), many species of which inhabit southern Asia and Africa, while one (*U. epops*) is a well known migrant in Europe. It is about 12 inches long, is brown above and white beneath, with black, white-barred wings, and a very large cinnamon-red black-tipped crest and a long, sharp, curved bill. It seeks its food on the ground, nests in holes in trees, crannies in walls, etc., and has many curious traits and habits which have caused the bird to take a prominent place in the folk-lore

of all countries. The African hoopoes belong to the genus *Irrisor*, and are called wood-hoopoes. They have brilliant plumage, but no crest. They go about in noisy flocks, and have much the appearance and habits of woodpeckers.

Hoorn, hōrn, or **Hoorne**, hōr'nē, or **Horn**, or **Hornes**, ōrn, COUNT OF (PHILIP II., DE MONTMORENCY-NIVELLE); Flemish soldier and statesman: b. about 1520; d. Brussels 5 June 1568. His father was a descendant of the French family of Montmorency, and on the mother's side he was related to Lamoral Egmont, with whose fate his own was linked. His mother becoming a widow when he was about eight, was married again to John, Count van Horn, one of the wealthiest nobles of the Netherlands, who, left his estates to his wife's children on condition that they should assume his name. Philip was thus at the outset of his career one of the most influential of his order, and received from Charles V. and Philip II. important trusts and distinctions. He accompanied Philip II. to Spain, where he is supposed to have received information of the designs of the Spanish court against the Netherlands, and to have communicated them to the Prince of Orange. Returning to the Netherlands he joined Orange and Egmont in resisting the aggressive policy of Philip; yet continued loyal to the crown. He was, however, suspected by the Spanish court, and upon the arrival of Alva in Brussels was enticed with Egmont to that city, and arrested in September 1567, on a charge of high treason. Ceaseless but vain efforts were made to obtain for him a fair trial, and appeals for clemency on his behalf were made by potentates in all parts of the Continent. He was executed with Egmont in June 1568.

Hoosac (hoo'sak) **Mountain**, the name given to a spur of the Green Mountains (q.v.) which is in the northwestern part of Massachusetts, on the east side of the valley of the Hoosac River. The whole length is about 16 miles. The mountain is noted for its beautiful scenery.

Hoosac Tunnel, in the towns of Adams and Florida, in Berkshire County, in Massachusetts, and piercing the Hoosac Mountain. It is on what is now known as the Boston and Maine railroad, the route from Boston to Troy, N. Y., by way of Greenfield. From the west entrance of the tunnel to Troy is 54 miles; from the east entrance to Boston, 137 miles. The tunnel is nearly five miles in length, the longest tunnel in the United States. Before the general introduction of railroads, and, as early as 1825, the project was broached of making a canal across Massachusetts from Boston to the Hudson River. This plan was abandoned when railroads were built across the State. In 1851 the tunnel question had advanced so far that surveys of various routes were made and some experiments were begun. The work of tunneling began in 1856 and was completed in 1873. For so long a tunnel the ventilation is good owing to the shaft, 1028 feet, sunk near the centre. The width is sufficient for two tracks. The total cost, including 39 miles of adjoining railroad, was about \$13,000,000.

Hoo'sic Falls, N. Y., village in Rensselaer County; on the Hoosac River and on the Boston & M. railroad; about 28 miles northeast of Albany. The first permanent settlement was

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made in 1688, and the first charter was received in 1827. The charter has been revised and the last revision was in 1890. The village has excellent water-power. The chief manufactures are agricultural implements, paper and paper-making machinery, shirts, cotton and woolen goods, and flour. The government of the village is vested in a president who holds office three years, and a board of trustees. Pop. (1890) 7,014; (1900) 5,671; (1910) 5,532.

Hoosier (hoo'zhér) **Schoolmaster, The**, a story by Edward Eggleston (q.v.) published in 1875, and the most popular of its author's works. It is descriptive of the life of the Middle West in the pioneer days of the early 19th century.

Hoosier State, a popular name for Indiana. The word is said to be a corruption of "husher," formerly a colloquial name for a fighter or a bully.

Hop-hornbeam. See IRON-WOOD.

Hopatcong, hō-pāt'kōng, **Lake**, in Sussex County, New Jersey; about 33 miles northwest of Jersey City and 25 miles west of Paterson. The lake is 725 feet above the sea, and eight and one-half miles long and three and one-half miles wide. Its outlet is the Musconetcong River which flows into the Delaware. Lake Hopatcong is a favorite summer resort, its beautiful scenery is one attraction. It is surrounded by hills and low mountains, all well wooded, and many of the trees are evergreens.

Hope, Anthony. See HAWKINS, ANTHONY HOPE.

Hope, Ascott R. See MONCRIEFF.

Hope College, in Holland, Mich., a co-educational institution, founded in 1866, by Dutch settlers, and under the auspices of the Reformed Church in America. At the close of 1910 there were connected with the school 20 instructors and 400 students.

Hope Diamond, a famous blue diamond weighing 44¼ carats, in possession of the family of H. T. Hope, of England, until 1903, when it was sold to an American.

Hope'dale, the name of a community founded by Rev. Adin Ballou, in 1841, at Milford, in Worcester County, Mass. At the beginning there were 28 persons who wished to lead lives in accordance with high ideals of Christianity. They formed themselves into a joint-stock company, purchased a farm of 238 acres, established a settlement, and proceeded to cultivate the soil, and to manufacture their own breadstuffs and clothing. At first a board of trustees were the chief governing power and had entire control of the industries. Later more responsibilities were given to the members, and the industries were, in different ways, apportioned among them. In 1854 there were 200 members; but the community had become a financial failure and dissensions had crept in. In 1856 they were in debt, and as a joint-stock company they disbanded; but continued as a semi-communistic community until about 1862, when they gave up the industries they had established to private individuals, and formed themselves into Hopedale Parish with their founder as pastor. Consult: Adin Ballou, 'Hopedale Community.'

Hop'kins, Alphonso Alvah, American author and lecturer: b. Burlington Flats, N. Y.,

27 March 1843. He was for three years professor in the American Temperance University; from 1867-86 was editor of three agricultural papers successively. Since 1868 he has lectured on temperance and other social and political subjects; in 1882 he was the prohibition candidate for governor of New York. He has written 'Geraldine, a Romance in Verse,' a popular poem in the style of Owen Meredith's 'Lucille' (1881); 'His Prison Bars' (1878); 'Sinner and Saint' (1880); 'Wealth and Waste' (1896); 'Ballads of Brotherhood' (1900).

Hopkins, Edward, American colonial governor: b. England 1600; d. London March 1657. He was a prominent merchant of London, and came to Boston in 1637, but soon after removed to Hartford, where he was chosen a magistrate in 1639, and governor of the colony of Connecticut every other year from 1640 to 1654, alternating with Haynes. He afterward went back to England, where he was chosen warden of the English fleet, commissioner of the admiralty and navy, and member of Parliament. But he never lost his interest in the colonies, and at his death bequeathed much of his estate to New England, giving £1,000 for the support of grammar schools in Hartford and New Haven, which are still flourishing, and £500 which went to Harvard College and the grammar school at Cambridge.

Hopkins, Edward Washburn, American philologist: b. Northampton, Mass., 8 Sept. 1857. He was graduated from Columbia in 1878, and going to Germany to study took the degree of Ph.D. at the University of Leipzig. In 1895 he became professor of comparative philology and Sanskrit at Yale. He has written 'Caste in Ancient India' (1881); 'Mann's Law-book' (1884); 'Religions of India' (1895); 'The Great Epic of India' (1901); and 'India Old and New' (1901).

Hopkins, Esak, first commodore of the American navy: b. Scituate, R. I., 1718; d. North Providence, R. I., 26 Feb. 1802. In November 1775 he received a commission from the Continental Congress as commodore and "commander-in-chief" of the navy, soon after which he put to sea with the first squadron sent out by the colonies. The fleet sailed for the Bahama islands, and captured the forts at New Providence, and with them 80 cannon, and a large quantity of ordnance, stores, and ammunition. On his return, when off Block Island, the commodore took the British schooner Hawke and the bomb brig Bolton. For this act the president of congress complimented Hopkins officially. Commodore, or Admiral Hopkins, as he was generally called (even by Washington, who so addressed him in his official letters), performed other remarkable exploits, though he had great difficulties to contend with. His name became a synonym for heroism, and for American patriotism. In June 1776, Hopkins was ordered by Congress to appear before the naval committee in Philadelphia to reply to charges which had been preferred against him for not annoying the enemy's ships on the southern coast. He was defended by John Adams, and was acquitted. The unavoidable delays at a later period in getting his ships ready for sea gave another chance for his enemies to complain; and neglecting a

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citation to appear at Philadelphia, because no specific charges were made against him, and on account of his general disgust at the conduct of his opponents, he was dismissed the service, 2 Jan. 1777. He resided near Providence, and exerted during a long life a great political influence in Rhode Island, being often elected to the general assembly of that State. Consult Field, 'Esek Hopkins' (1898).

Hopkins, John Henry, American Protestant Episcopal bishop: b. Dublin, Ireland, 30 Jan. 1792; d. Rock Point near Burlington, Vt., 9 Jan. 1868. At the age of eight, he was brought to America, his father settling in Philadelphia. He became a successful member of the bar in Pittsburg, where his interest in church work was so earnest that the vestry of Trinity Church unanimously elected him rector of the parish though he was not even a candidate for orders. He accepted the call, was ordained in 1823, and remained in Pittsburg until 1831, when he went to Trinity Church, Boston, as assistant, and became at the same time professor of systematic divinity in a theological school. He was consecrated bishop of Vermont in 1832 and combined with the episcopate the rectorship of St. Paul's Church, Burlington. Though at the head of a small diocese, he exerted a widespread influence as a learned theologian and a controversialist of uncompromising bravery and great versatility. He is said to have been the first to suggest the idea out of which grew the important Lambeth Conferences of the entire Anglican Communion, and it is unquestionably to his prudent and charitable efforts that the happy reunion of the northern and southern dioceses after the Civil War was largely due. Besides controversial works, which at the time had great effect, he published 'The Primitive Creed' (1834); 'The Primitive Church' (1835); 'The American Citizen' (1857); and 'The Law of Ritualism' (1866). See 'Life of Bishop Hopkins by One of his Sons' (1873).

Hopkins, Johns, American financier and philanthropist: b. Anne Arundel County, Md., 19 May 1795; d. Baltimore 24 Dec. 1873. His parents, Quakers, gave him a fair education and the training of a farmer. At 17 he went to Baltimore, there became a grocer, and in 1822 founded the house of Hopkins & Brothers. He built up a trade in Maryland, Virginia, and North Carolina, having practically a monopoly in his line. His credit and counsel were highly valued in financial and mercantile affairs. He retired in 1847 with a large fortune, which he employed in banking and railway operations. In 1873 he gave property worth \$4,500,000 to found a free hospital; he presented Baltimore with a public park, and also gave over \$3,000,000 to found the Johns Hopkins University in Baltimore.

Hopkins, Lemuel, American physician and political writer: b. Waterbury, Conn., 19 June 1750; d. Hartford, Conn., 14 April 1801. He practised medicine at Litchfield 1776-84, when he removed to Hartford, where he sustained a high reputation, and had an extensive practice till his death. He was singular in his appearance, manners, and opinions; a man of talents and learning, and also a poet. He was associated with Trumbull, Barlow, Alsop, Theodore

Dwight, and others (called the 'Hartford wits'), in the 'Anarchiad,' the 'Echo,' 'Political Greenhouse,' the 'Gumlotine,' and similar satirical compositions; and is said to have written for Barlow the beautiful and well known version of the 137th psalm beginning, 'Along the Banks where Babel's Current Flows.'

Hopkins, Margaret Sutton Briscoe, American author: b. Baltimore 7 Dec. 1864. She married Prof. A. J. Hopkins of Amherst College, and has been engaged in literary work since 1890. She has written under the pen name of 'MARGARET SUTTON BRISCOE' 'Perchance to Dream and Other Stories' (1892); 'Links in a Chain' (1893); 'Jimty and Others' (1898); 'The Sixth Sense and Other Stories' (1899).

Hopkins, Mark, American college president: b. Stockbridge, Mass., 4 Feb. 1802; d. Williamstown, Mass., 17 June 1887. He was graduated at Williams College, Mass., in 1824, and having filled a tutorship in the college two years received in 1828 the degree of M. D., and in the same year commenced the practice of medicine in New York. In 1830 he was recalled to Williams College to fill the chair of moral philosophy and rhetoric, and in 1836 became president of the college, a position which he held till 1872. In addition to his labors as an instructor, he lectured before the Lowell Institute of Boston, the Smithsonian Institution, and various scientific and literary associations. Presiding over a college which has been called the cradle of foreign missions, he took an active part in the deliberations of the American board of commissioners for foreign missions, of which he was president from 1857. He published 'Lectures on the Evidences of Christianity' (1846); 'Miscellaneous Essays and Discourses' (1847); 'Lectures on Moral Science' (1862); 'The Law of Love and Love as Law' (1869); 'Outline Study of Man' (1873); 'Scriptural Idea of Man' (1883); 'Teachings and Counsels' (1884). See Carter, 'Life of Mark Hopkins' (1892).

Hopkins, Pauline Bradford Mackie, American novelist: b. Fairfield, Conn., 1874. In 1899 she married H. M. Hopkins; she has been in literary work since 1896. Her works include 'Mademoiselle de Berny, a Story of Valley Forge' (1897); 'Ye Lyttle Salem Maide, a Story of Witchcraft' (1898); 'A Georgian Actress, an Historical Romance' (1900).

Hopkins, Samuel, American Congregational clergyman: b. Waterbury, Conn., 17 Sept. 1721; d. Newport, R. I., 20 Dec. 1803. He was graduated at Yale College in 1741, studied theology under Jonathan Edwards (q.v.), and in 1743 was ordained at Housatonic, now Great Barrington, Mass., where he continued until 1769, when he removed to Newport, R. I., and was pastor there till his death. He possessed almost incredible powers of application, and is said to have been sometimes engaged during 18 hours of the day in his studies. He published 'Dialogue, Showing it to be the Duty and Interest of the American States to Emancipate all their African Slaves' (1776); 'System of Doctrines Contained in Divine Revelation, Explained and Defended' (1793); etc. His theological opinions gave rise to the famous Hopkinsian Controversy. Hopkins differs from orthodox Calvinism in his opposition to the doc-

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trines of original sin and of the atonement; moreover, he put particular stress on the virtue of altruism and unselfishness, even claiming that selfishness, of whatever nature, was inherently and essentially sinful. Consult: West, 'Life of Hopkins' (1805); Park, 'Memoir' (1852). See also Mrs. Stowe's novel, 'The Minister's Wooing,' in which Hopkins is the central figure.

Hopkins, Stephen, American statesman; a signer of the Declaration of Independence: b. Scituate, R. I., 7 March 1707; d. Providence 13 July 1785. In 1733 at Providence he was elected a member of the general assembly, and in 1739 became chief justice of the court of common pleas. In 1755 he was elected governor of the State, and remained in office, with the exception of four years, until 1768. In 1754 he was appointed a member of the board of commissioners assembled at Albany, N. Y., to concert a plan of union for the colonies. In 1765 he was elected chairman of a committee appointed at a special town meeting held in Providence to draft instructions to the general assembly on the stamp act. In August 1774, he was, with Samuel Ward, elected to represent the State in the general Congress held at Philadelphia, and was also chosen in 1775 and 1776. On the naval committee he was placed next after John Hancock, the chairman, and greatly assisted in the formation of a navy. For 50 years he filled some public station; he was for many years chancellor of Brown University. In 1765 he commenced a 'History of the Planting and Growth of Providence,' published in the 'Providence Gazette.' In the same year he published 'The Rights of the Colonies Examined,' which was reprinted in London.

Hopkins, Tighe, English author: b. 8 Dec. 1856. He is a frequent contributor to English and American periodicals and among his numerous works are 'Twixt Love and Duty' (1886); 'For Freedom' (1888); 'Dungeons of Old Paris' (1898); 'An Idler in Old France' (1889); 'The Man in the Iron Mask' (1901).

Hopkinson, Francis, American jurist; one of the signers of the Declaration of Independence: b. Philadelphia 21 Sept. 1737; d. there 9 May 1791. He was graduated at the College of Philadelphia (now the University of Pennsylvania), having been the first student who entered that institution at its opening, and afterward studied law. In 1776 he was sent from New Jersey as one of her representatives in Congress. During the Revolution he distinguished himself by satirical and political writings, which attained such popularity that it has been said that few pens effected more than Hopkinson's in educating the American people for political independence. He also ridiculed in prose and verse most of the social follies of his time. In 1779 he was made judge of the admiralty of Pennsylvania, which office he held for ten years, until the organization of the federal government, when it expired. As soon, however, as Washington became President of the United States, he addressed to Hopkinson a letter enclosing a commission as United States district judge for Pennsylvania. He was skilled in painting and music, composing highly popular airs for his own songs. Of his political writings the most prominent were: 'The Pretty Story' (1774); 'The Prophecy' (1776); 'The Political

Catechism' (1777). The best known of his poems are: 'The Battle of the Kegs,' a humorous ballad, and 'The New Roof, a Song for Federal Mechanics.' The 'Miscellaneous Essays and Occasional Writings of Francis Hopkinson' were published in 1792.

Hopkinson, Joseph, American jurist and poet: b. Philadelphia 12 Nov. 1770; d. there 15 Jan. 1842. He was a son of Francis Hopkinson (q.v.). He was educated at the University of Pennsylvania, studied law, and began to practise at Easton, Pa., in 1791, whence he returned to Philadelphia. From 1815 to 1819 he was a member of the House of Representatives from Philadelphia. He opposed the recharter of the United States bank, and made a noted speech on the Seminole war. At the close of 1819 he retired from Congress, declining a re-election. Having gone to Bordentown to reside, he was elected to the legislature of New Jersey. In 1828 he was appointed judge of the United States court for the eastern district of Pennsylvania, an office which had been filled by his father under Washington. In 1837 he was chairman of the judiciary committee of the convention to revise the constitution of Pennsylvania. He is, however, best known as the author of the national song 'Hail Columbia,' written in 1798 for the benefit of an actor named Fox.

Hopkinsville, Ky., city and county-seat of Christian County, on the Louisville and Nashville, and the Ohio Valley R.R.'s. Here are Bethel Female and Southern Kentucky colleges, Western Kentucky insane asylum, and manufactures of tobacco, lime, brick, wagons, and carriages, a national bank and the Hopkinsville high school. The city has an assessed property valuation of over \$2,000,000. Pop. (1910) 9,419.

Hopper, De Wolf, American actor: b. New York 1858. He made his first professional appearance in 'Our Boys' (1878), and later appeared in 'Hazel Kirke' and other plays. He studied vocal music for several years and became a star in comic opera and musical comedy.

Hopper, Isaac Tatem, American philanthropist: b. Deptford, N. J., 3 Dec. 1771; d. New York 7 May 1852. He was a member of the Society of Friends, and in the division which took place in 1827-8, joined the anti-orthodox or "Hicksite" branch. In 1829-41 he was director of a New York shop for the sale of Hicksite books, in 1841-5 was treasurer and book-agent of the Anti-Slavery Society, and from 1845 devoted his efforts to the work of the New York Prison Association. He was widely known for his interest in benevolent objects, especially negro emancipation and the assistance of discharged prisoners. At Philadelphia he was a founder and the secretary of a society for the employment of the poor, teacher in a colored school, and otherwise interested in philanthropic measures. He was an eloquent speaker. Consult the 'Life' by Child (1853).

Hop'pin, James Mason, American scholar and author: b. Providence, R. I., 17 Jan. 1820. He was graduated from Yale in 1840, studied law at the Harvard law school (1841-2), theology at the Union and Andover seminaries (1843-5) and the University of Berlin (1847-9), was ordained to the Congregational ministry in 1850, and was

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pastor at Salem, Mass., in 1850-9. In 1861-79 he was professor of homiletics at Yale, in 1861-3 also pastor of the College church, and from 1879 until his retirement as professor emeritus in 1899 professor of the history of art. His publications include 'Notes of a Theological Student' (1854); 'Old England: Its Art, Scenery, and People' (1867); 'The Office, and Work of the Christian Ministry' (1869); 'Homiletics' (1881); 'Pastoral Theology' (1889); 'The Early Renaissance' (1892); and 'Greek Art on Greek Soil' (1897).

Hoppner, hōp'nēr, John, English portrait painter: b. London 4 April 1758; d. 23 Jan. 1810. He entered the schools of the Royal Academy in 1775; and became a fashionable portrait painter and the rival of Lawrence. He was a member of the Royal Academy in 1795. His paintings have suffered from his use of bad mediums; but his reputation has risen, and in 1896 a portrait by him was sold for 1,800 guineas.

Hopps, John Page, English Unitarian clergyman: b. London 6 Nov. 1834. He was educated at the Baptist College in Leicester, and first entered the Baptist ministry. Becoming a Unitarian, he held pastorates in Unitarian churches in Sheffield, Dukinfield, Glasgow, Leicester, and Croydon. He was a member of the first school board of the city of Glasgow. He was proprietor and editor of 'The Truth-seeker,' 1863-87, and became editor of 'The Coming Day' in 1891; he has written 'Pilgrim Songs'; 'A Scientific Basis of Belief in a Future Life'; 'The Alleged Prophecies concerning Jesus Christ in the Old Testament'; 'The Plain Truth about the Bible'; 'First Principles of Religion and Morality.'

Hops (*Humulus lupulus*) are a climbing plant, often met with in the wild state in northern Europe and in North America. The hop belongs to the hemp family (*Cannabaceae*) and it is the sole representative of its genus, but is cultivated in many varieties. It is a dioecious plant, that is, the pistillate (female) and staminate (male) inflorescence is borne by different plants. In American and English hop-gardens it is customary to grow a sprinkling of male plants, but these are rigorously excluded on the Continent. In the former case the pistillate inflorescence becomes impregnated and forms seeds, in the latter they do not. In good hops the seeds are scarce, small, shrunken and sterile, that is incapable of propagating the plant. Many believe that the formation of seed ought to be prevented, as the seeds are useless to the brewer, the main consumer of hops, and besides they only add weight to the hops. Hop-plants are not raised from seeds, but are propagated by cutting off and transplanting portions of the underground stem or root. Only the pistillate plant is cultivated, because its ripe flower is the part of the hop-plant used in brewing. It has been introduced into Brazil, Australia and the Himalayas.

The hop is a perennial herbaceous plant, which produces each year several long twisting, striated stems, 15 to 20 feet in length, which clamber over hedges, brush, etc., with ease. The leaves are stalked, opposite, three to five lobed, and coarsely serrate. They are, like the stem, rough to the touch. The male inflorescence forms a panicle; the flowers enclose five stamens

in a small greenish five-parted perianth. At an early stage the female inflorescence is less conspicuous. The strobile or catkin consists of several small acute bracts or leaves at whose base are situated two sessile ovaries, each subtended by a rounded bractlet. These bracts are attached to the extremity of the stem in such a way as to form a cone, and are shaped similar to roofing tiles, being one half to three quarters of an inch long.

The ovary and the base of the bracts are covered with a yellowish powder, the "hop-meal" or lupulin, which is the active principle of the plant.

Only a very slight amount of hops is used in medicine, being chiefly employed as a stomachic in dyspepsia; a pillow stuffed with hops is said to induce sleep. Nevertheless by far the largest portion of the hops produced is used in the manufacture of various beers, so that here this subject is treated with that idea in view.

The pistillate plant alone is cultivated, because hop growers on the Continent, especially Germany and Austria, find that unfertilized pistillate plants produce strobiles richer in aroma, more plenteous in lupulin, and in general better than where the plants were fertilized through the pollen of the staminate plant. In the United States we always find the strobiles containing much seed, while the choice imported Bohemian and Bavarian hops are seedless. The pistillate plant flowers in August, and its strobiles are ready for harvesting during September.

The continental European growers always strive to have early, medium and late hops, so that there the hop-picking begins late in August and lasts through the early part of October. In the United States the picking is usually over in two weeks. The time at which the strobile is fit to pick is indicated by the change of color from a light golden to a somewhat deeper hue, also by the closing up at the tips and making a rustling sound when touched. The seeds should be firm and dark in appearance before the hops are gathered. Much loss can occur by too early picking, while too late harvesting is also detrimental to the value and quality of the product.

For about 1,000 years hops have been added to beer or wort, in former times to prevent its spoiling and also to give it its pleasant and characteristic flavor and aroma; and its cultivation has progressed as the manufacture of beer became more widespread. Germany and England had hop gardens in the 8th and 9th centuries, but the cultivation was not rationalized until the 16th century, and at the present is a very important agricultural product.

Abroad the finest hops are raised in Bohemia, its "Saazer" hops being known throughout the world. Next to this ranks the Bavarian "Spalter hops," and the product of the so-called "Hallertau." As a rule the Bavarian hop is stronger than the Bohemian, but somewhat inferior in quality. Würtemberg, Saxony, Baden, Prussia and Alsace also raise a good quality of hops; and Belgium, northern France and Burgundy cultivate it on a large scale. England's most famous hops are the "Farnhams," the "Golony" and "Grape" varieties. Owing to the high import taxes, Russia has also begun to raise hops. Of all these only the "Saazer" and the "Spalter" are imported to the United States. The follow-

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ing table gives an idea of the size of the world's production during the years 1905 and 1909:

WORLD'S PRODUCTION OF HOPS IN POUNDS.

COUNTRIES	1905	1909
United States.....	55,536,000	36,000,000
German Empire.....	64,500,000	13,356,000
Austro-Hungary.....	40,080,000	18,300,000
France.....	11,065,000	3,000,000
Belgium and Holland.....	11,439,000	2,658,000
Russia.....	14,500,000	8,125,000
Great Britain.....	77,946,000	24,022,000
Australasia.....	2,194,000	2,475,000
	277,260,000	107,936,000

In the United States, the culture of hops was introduced as early as 1625 in New Netherlands, and 23 years later in Virginia, but although encouraged by special legislation in 1657, never assumed its present important agricultural role until 1800. During the first half of the 19th century Vermont produced seven eighths of the entire United States crop; since then New York has held first place. It has always been the tendency of hop cultivation to concentrate in well-defined districts, but in spite of this accumulative tendency, the centre of cultivation has slowly but surely moved westward. At first Massachusetts, Vermont and Maine were the chief hop States, but as the quality of

the New York hops was far superior, and the quantity three times as great, the former States soon abandoned hop culture. The result was that during 1850-65 a small portion of New York, lying south of the New York Central Railroad between Rochester and Albany, monopolized the hop raising of the United States. Small patches were planted in Wisconsin and Michigan in 1860 and in 1866, when the New York crop was completely destroyed by vermin. Wisconsin hop-growers obtained exorbitant prices for their excellent product, which induced many to plant hops, expecting to realize a fortune in a few years, but the prices speedily declined owing to an overproduction. During 1870 and 1880 New York again was at the head, but at that time fresh competition began to develop on the Pacific coast. The "Russian River" hops of California were a marvel; their texture was "fine as silk"; their color "bright golden"; they were "clean picked"; their "contents of lupulin" second only to the best German brands, so that it was no wonder that hop-culture there advanced quickly to 40,000 bales, the yield of 1902. The first of the three following tables shows the yield in pounds of the various States from 1849 to 1899. The next table gives a comparison between the acreage, yield and value of the hop crop for 1899, 1889, and 1879; and in the third table this comparison has been calculated to

STATE	1899	1889	1879	1869	1859	1849
New York	17,332,340	20,063,029	21,628,931	17,558,681	9,671,931	2,536,299
Washington	6,813,830	8,313,280	703,277	6,162	44	.....
California	10,124,660	6,547,338	1,444,079	625,064	80	.....
Oregon	14,675,577	3,613,926	244,371	9,745	493	8
Wisconsin	165,346	428,547	1,966,827	4,630,155	135,587	15,930
All other States.....	97,951	205,359	558,895	2,626,862	1,183,861	944,792
Total U. S.....	49,209,704	39,171,270	26,546,378	25,456,669	10,991,996	3,497,029

STATE	Acres under Cultivation			Yield of Hops in Pounds		
	1899	1889	1879	1899	1889	1879
New York	27,532	36,670	39,072	17,332,340	20,053,029	21,628,931
Washington	5,296	5,113	534	6,813,830	8,313,280	703,277
California	6,890	3,974	1,119	10,124,660	6,547,338	1,444,079
Oregon	15,433	3,130	304	14,675,577	3,613,926	244,371
Wisconsin	342	967	4,439	165,346	428,547	1,966,827
All other States	120	358	1,332	97,951	205,359	558,895
Total	55,613	50,212	46,800	49,209,704	39,171,270	26,546,378

STATE	Average Yield in Pounds per Acre			Value of Total Yield			Value of Crop per Acre		
	1899	1889	1879	1899	1889	1879	1899	1889	1879
New York	629.33	547.12	553.55	\$1,600,305	\$2,210,137	\$6,488,678	\$ 58.30	\$ 60.30	\$166.08
Washington	1,286.41	1,625.91	1,316.99	589,582	841,206	210,983	111.32	164.52	295.09
California	1,468.02	1,647.54	1,290.50	925,319	605,842	433,223	137.06	152.40	387.13
Oregon	950.92	1,154.52	803.85	937,513	322,700	73,311	60.75	103.09	240.15
Wisconsin	483.47	443.17	443.09	18,020	51,983	590,048	56.19	53.78	130.67
All other States.....	816.26	537.60	412.09	11,190	27,983	167,668	93.25	78.11	125.12
Total	884.85	780.11	567.23	4,081,929	4,059,697	7,963,913	73.39	80.65	170.17

STATE	1899			1889			1879		
	Per cent of Acreage	Per cent of Yield	Per cent of Value	Per cent of Acreage	Per cent of Yield	Per cent of Value	Per cent of Acreage	Per cent of Yield	Per cent of Value
New York	49.5	35.2	39.3	73.0	51.2	54.5	83.4	81.4	81.7
Washington	9.5	13.8	14.5	10.1	21.2	20.8	1.3	2.7	2.6
California	12.4	20.5	22.6	7.9	16.7	14.9	2.4	5.4	5.3
Oregon	27.7	29.8	22.8	6.2	9.2	7.9	0.6	0.9	0.9
Wisconsin	0.65	0.43	0.44	1.8	1.0	1.2	9.5	7.5	7.4
All other States.....	0.25	0.25	0.26	0.7	0.7	0.7	2.8	2.1	2.1

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percentages of the total United States crop, in order to give a clearer idea of the hop industry during these years.

New York hops are almost entirely consumed in the United States, while the greater amount of the Pacific coast hops (especially Oregon) is exported. The English production is scarcely ever sufficient for its needs, so that Great Britain must import some and mostly takes Oregon hops, because they are especially adapted to the English ale brewer's requirements.

The hop plant is subject to many diseases, due mostly to parasites, among which are the hop plant-louse (*Phorodon humuli*), the hop-grub (*Gortyna immanis*), the hop-vine snout-moth (*Hypona humuli*), the hop-merchants (*Polygona interrogationis*), the zebra caterpillar (*Mamestra picta*), the common woolly bear caterpillar (*Spilonoma virginica*), the saddle-back caterpillar (*Empetria stimulea*), hop vine leaf-hopper (*Tettigonia confluenta*); various beetles, the "red spider" or spinning mite, and the needle-nosed hop-bug (*Calocoris fulvomaculatus*), which mostly produce red smut, etc., and even destroy entire crops. Fungus pest, blight and mold (black smut), are extremely rare in the United States, although widespread in England and Europe. It is almost impossible to eradicate these pests, except by extreme measures. The best remedies for the destruction of the animal parasites is the use of bisulphide of lime or a heavy spraying of soap and tobacco emulsion. Sulphur in any form is a good remedy, and a spray of kerosene soap emulsion, to which a small quantity of flowers of sulphur is added, is generally effective. In extreme cases the affected plants are cut down and burned to prevent a spread of the disease.

The elements also play havoc with the development of the tender hop-vine. High winds will tear the vine from its support; drouth will tend to change the color of the light yellow strobile to the objectionable "pole redness"; and too much water will produce a lack of lustre, when the hops are said to be "blind." This is due to the fact that the entire energy of the plant is spent in the formation of leaves, the strobile being scarcely developed.

Hops contain hop-oil, hop-resins, acids, hop-tannin, hop-bitter, hop-wax, nitrogenous bodies, carbohydrates and mineral substances. Diastase (an enzyme) has also been found, which is especially valuable in ale brewing. Hop-oil, the principal constituent of the lupulin, present in 0.2 per cent to 0.8 per cent, is obtained by distilling the hops with water. It is colorless and hardly soluble in water. The characteristic agreeable aromatic flavor of the hops depends on this oil. If exposed to air the oil turns to resin, passing to valerianic acid, to which the cheesy odor of old hops can be traced. According to Hayduck, there are three resins in hops, the α , β , and γ , of which the first two are soft and the latter hard. The preserving, antiseptic effect of hops is due to the two soft resins, as they are distinctly prejudicial to the growth of butyric acid and many other bacteria, but do not have much effect on acetic acid bacteria and sarcina. In old hops valerianic acid, malic acid, citric acid and succinic acid are present. Hop-tannin is chiefly stored in the leaves of the strobile and is a pale brown amorphous powder soluble in dilute alcohol, which through oxida-

tion passes into phlobaphen. The hop-bitter is obtained from the two soft resins, and imparts a pleasant bitter taste to the beer, without which it would be flat and insipid. Hop-wax is present in considerable proportions in hops, but, since it is insoluble in water and even in 90 per cent alcohol, it has no value in beer. Nitrogenous constituents of hops are about 2 per cent to 4 per cent, which calculated to albumen are 12 per cent to 24 per cent, of which 0.75 per cent to 1.6 per cent are soluble. Bungerer maintains that 30 per cent of the nitrogenous substances are asparagin. Behrens says that trimethylamin and free ammonia are also present. Griess and Harrow have discovered cholin in hops. Brown and Morris have shown the presence of an enzyme similar to diastase, which will saccharify starch, that is, change it into sugar. This enzyme is chiefly accumulated in the seeds. The carbohydrates contained are cellulose, sugar, dextrin. According to Brown and Morris there is present 1.55 per cent dextrose and 2.10 per cent levulose, together 3.65 per cent of inverted sugar. According to Thausing hops contain 5.3 per cent to 15.3 per cent of ash and an average of 7.54 per cent, of which over one third is potash, one sixth phosphoric acid, one sixth silica, and some sodium, lime, magnesia, iron oxide, sulphuric acid and chlorine. The presence of an alkaloid in the seed has been ascertained by Dr. Ernst Hantke, but research on this point is still progressing.

Although it is possible to estimate with a fair degree of accuracy the several constituents of hops, it has not been so far found possible to establish any definite relation between the value of the hops and the amounts of hop-oil, resins, tannin, etc., which they contain. Consequently up to the present time, chemistry has not afforded much assistance in this direction. Hence the value of hops is still judged according to its general properties. The color, size and appearance and lustre of the strobile, the quantity and color of the lupulin, the amount of seed, the odor, taste and cleanliness, are the essential points in the valuation of hops.

Fine hops possess a silky lustre which is lacking in inferior grades. The color is greenish yellow, varying with the origin. New York hops have a somewhat paler color of a stronger greenish shade, while the Pacific coast hops have a more pronounced yellowish color. A reddish tint may indicate pole-redness, or, what is worse, that the hops have become overheated in the bale, which implies a darker coloration of the lupulin and deterioration of quality. The form and size of the strobile is also characteristic of the origin. Small strobiles are preferable to big ones, as they contain on an average more lupulin; and the fewer the seeds the better. The bracts ought to lap over one another and hold firmly together, whereby the lupulin is kept in better. The odor and aroma should be strong, fine, free from any off-smell such as odors of fruit, garlic, etc. Only very slight amounts of stems, foliage, or stripped cones should be present, as they impart a coarse taste to the beer. The amount of lupulin present in the strobile is an indicator of the value of the hops, because it contains those resins, volatile oils and bitter substances, which are so essentially valuable to the brewer. In fresh hops,

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slight pressure will force out the contents of the strobile in a transparent droplet, but in old hops the contents of the lupulin granule will not flow, due to resinification, and the expressed juice is more syrupy, wax-like and opaque. In short, the preparation of the strobiles for the market should be as follows: After the crop has been harvested, it is dried. The largest part of the German crop is merely air-dried or sun-dried, and it is claimed that this "natural cure" preserves far more of the essential oils and other active principles than is possible by the artificial hot-air cure used in the United States and England, and that this at least in part accounts for the peculiarities of Spalt hops that command such extraordinary prices. The kiln in which the hops are dried resembles in some respects the drying kiln of the maltster. This process requires great care, as much of the hops may be easily damaged. When the moisture has been completely removed, sulphur is placed on the fire, which has the effect of brightening the color; the evolved sulphurous acid also acts as an antiseptic, destroying to some extent the germs of mould-fungi and other organisms. After drying, the hops are stored three or four days, whereupon they are baled and are then ready for the market. They are easily affected by warmth, moisture, air and light, and for this reason must be protected in storage against these influences. For brewing purposes it is almost impossible to pass off a substitute for hops, although lupulin and hop-extract are now manufactured. The lupulin is separated from the strobile, and inasmuch as it contains the essential constituents for which hops are used in brewing, it can be better utilized, although it is impracticable and impossible to replace the entire quantity of hops with lupulin alone because it contains very little tannin, which also is essential. The same remark is applicable to hop-extract.

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Horace (QUINTUS HORATIUS FLACCUS), Roman poet of the Augustan Age: b. Venusia, Italy, 8 Dec. 65 B.C.; d. Rome 27 Nov. 8 B.C. Our information about Horace's life is derived in the main from his own writings, which are supplemented in a few details by a brief biography attributed to Suetonius. He was born at Venusia, a small town in Apulia, near the boundaries of Lucania and Samnium. His father was a freedman, and, according to Horace's own statement, followed the trade of a *coactor*, or collector. He seems to have prospered, for he was able to purchase a small farm. He was not satisfied to send the boy to the local school of Flavius, which was patronized by the aristocracy of Venusia, but moved to Rome to give his son the best possible educational advantages. It is to his credit that he did this, not that Horace might better his position in life, but for the sake of the education itself. At the capital he supplied his son with the means of making a creditable appearance, and he himself accompanied him to and from his classes, giving him moral instruction in a shrewd and homely way by pointing out men who offered examples to be followed or shunned. To this training Horace owed both his habit of self-examination and his consequent temperance

and self-control, and that keen observation of men and things which is one of his marked characteristics. He nowhere makes mention of his mother, who very likely died while he was an infant.

At Rome Horace pursued the usual grammatical studies under the notorious "flogging Orbilius," and doubtless supplemented them by more advanced work in rhetoric and literature. It is, however, in marked contrast to the fulness of our information about the other details of his life, that we know little or nothing about the masters who influenced him or about the particulars of his education, except that he implies that he attended the classes of several teachers. We may, however, infer something from the results. He certainly acquired a taste for reading, both in the literature of Greece and that of his native land, a habit which he continued to follow throughout his life. Somewhere about 46 B.C., in his 19th year, Horace went to Athens to study philosophy but he does not seem to have been especially attracted by any particular school. In his early life he leaned toward the Epicurean doctrine, but as time went on he turned more and more to that of the Stoics, without, however, committing himself to either sect. The assassination of Cæsar and the arrival of Brutus in Athens in September 44 B.C., put an end to his quiet student life. He joined the army of the liberators, and received a commission as tribune, though he was in no way fitted for the post. At Philippi he fled from the field with the rest of the routed forces, and, as he himself says, "left his shield behind." His humble estate was confiscated, but on his return to Rome in 41, when a general amnesty was granted by Octavian, he in some way secured a position as clerk in the quæstor's office, which furnished him the means of livelihood.

Horace freely admits that it was lack of money which first led him to write verse, and it was to his efforts in this line that he owed his advancement. He soon made the acquaintance of Vergil and of Varius, by whom he was introduced to Mæcenas. After a delay of several months, during which the astute statesman doubtless took the young man's measure, his position was established by his admission to the select circle of Mæcenas' literary friends. This honor, as he says with pardonable pride, was due not to high birth, but to his personal character. In 33 he received from his patron a small estate, the famous Sabine farm, situated in the valley of the Digentia, a small stream flowing into the Anio, about 30 miles northeast of Rome. Through Mæcenas he became intimate with the most eminent men of the day, both in literary and in political life, including Augustus. Toward the emperor his attitude was one of dignified independence. He was quick to recognize the advantages of the peaceful and established order of things which Augustus had brought about, and he celebrates it in many of his odes; but he did not hesitate to decline the position of private secretary which the emperor offered him. This he did without giving offense, for Suetonius quotes extracts from letters of Augustus which indicate a cordial and even an intimate friendship. Horace also preserved his independence in his relations with his benefactor Mæcenas, as appears from several pas-

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sages in his works, although he showed a proper gratitude for his many favors.

In the year 35 Horace issued his first book of satires, to which he himself gave the title of 'Sermones,' or familiar talks. On this branch of literature, which the Romans claimed as their own creation, see SATIRE. He took as his model Lucilius, and at first seems to have followed him closely, but he soon found himself out of sympathy with the earlier poet's severity in invective and disregard of form. In the fourth and tenth Satires he subjects the work of his predecessor to a thorough criticism, and defines his own ideal of what satire should be. This book was complete in itself, and begins with an essay addressed to Mæcenas. That the reception given to his first effort, which did not lack serious defects, was not wholly favorable, and that Horace had not satisfied himself, is evident from the poet's own words in the introductory essay of the second book, which seems to have appeared in the year 30. This book marks a great advance on the first, from which it differs in its externals in having no formal dedication and in being cast almost wholly in dialogue form, whereas in the first book Horace himself had been the chief speaker. In the following year, urged by Mæcenas, Horace published his first collection of lyrics, some of which doubtless represent his earliest attempts at verse. It was a volume of 17 Epodes, or 'Iambi,' as he himself named them. He chose as his model the Greek iambic poet Archilochus, and followed him closely in form. His work, however, has little of the bitter invective for which the Greek poet was notorious, and Horace shows no little originality both in his choice of themes and in his treatment of them. Six years later Horace, now a man of 42, published the first three books of the Odes, which form a work complete in itself, opening with a dedication to Mæcenas and closing with an epilogue in which he predicts his own immortality. In his choice of metres he followed especially Alcæus and Sappho, from whom he also took many of the subjects of his odes. But he shows the influence of many other Greek poets, as well as considerable independence. Although this work did not wholly escape hostile criticism, it at once placed Horace in the front rank of Roman poets. This position was formally recognized in 17 B.C. through his appointment by Augustus to write the ode, the well-known 'Carmen Sæculare,' which was sung at the celebration of the secular games in that year.

His next work was a return to the field of satire, for the 'Epistles' belong with the 'Sermones' to that branch of literature in the Roman sense of the term. They differ from the 'Sermones' in their greater finish and in their external form. Horace regarded the hexameter as the conventional form for satire, and the poetic epistle represents his third and final choice of form for his essays in that measure. The first book was apparently issued in the year 20. Horace was then a mature man, who had made his mark, and his tone is more assured and his self-appreciation is greater, though without any trace of egotism. The practical philosophy of life seemed to him the thing most worthy of serious consideration, and to teaching this he proposed to devote the rest of his literary work. This book, which consists of 20 letters,

of which some are genuine and some fictitious, is also dedicated to Mæcenas. The second book is devoted wholly to literary criticism, a subject which lay within the domain of satire and had already been handled in some of the 'Sermones.' The chronology of the book is somewhat difficult. It was probably published in the year 14. Whether the *Ars Poetica* formed the third letter of the second book or not is uncertain. It has been assigned to various years from 20 to 8 B.C., and if it really belongs to the latter date, it must have been published separately, perhaps after Horace's death, and is the latest of his works. The title which Horace gave it seems to have been 'Epistula ad Pisones,' but it received its present designation at an early period. The second book of epistles begins with a letter addressed to Augustus, who is said by Suetonius to have taken Horace to task for dedicating none of his works to him. In his epistles, Horace had formally renounced lyric poetry. Nevertheless, at the express request of the emperor, he published a fourth book of odes in 13 B.C. This collection, though admirable in form and containing some of Horace's best work, is characterized by a certain perfunctoriness and lack of spontaneity. It was not addressed to Mæcenas, but is without a formal dedication. This was, however, not due to any diminution of his regard for his patron, but to the fact that the book was published by the special request of Augustus.

Of the remaining years of the poet's life we know very little. Suetonius says that he died 27 Nov. 8 B.C., and there seems to be no ground for rejecting this testimony. No authentic portrait of Horace has come down to us. From his own allusions to his personal appearance, and from a letter of Augustus, quoted by Suetonius, we learn that he was stout and short, with dark eyes and hair, but prematurely gray. He further tells us that he was quick to anger, but easily appeased. He never married, and of all the loves of which he sings, Canara alone seems to be other than imaginary.

It is probably safe to say that Horace has been the most widely read of all Roman writers, not excepting Vergil, and that he has appealed to a more varied circle of readers than any of his countrymen. This statement applies especially to his odes, since it is to them that his popularity with the general public is for the most part due. It has been said that the odes are not poetry of the highest type, and that when they are analyzed and their contents subjected to searching criticism, the sum total of poetic material is scanty. This is unquestionably true, yet it is equally true that their influence and popularity have none the less been great. This is due in part to the personality of the man and the sympathetic feeling which he rouses in his readers on account of his broad humanity; and in part to the fact that the very simplicity of the odes and their ease of comprehension appeal to readers of all classes. As Mackail says, he realized that limited as was his own range of emotions, that of mankind at large was still more so. In some cases, notably in the love poems and the convivial odes, we are conscious that he did not always feel even the emotions which he describes. In spite of all criticism, the one undoubted fact remains, that the odes of Horace have pleased readers of all epochs and all sorts and conditions of men.

Horace's claim to originality is greater than is usually admitted. In his day the question of imitation of Greek models had ceased to exist, and the question was, rather, which model to choose. In the Augustan Age we find two schools, those who followed the Alexandrine writers, and those who went back for their inspiration to the Greeks of the classical period. Horace belonged to the latter class. His contempt for the followers of Alexandria is outspoken, and so indiscriminating as to include such really great poets as Calvus and Catullus. He certainly knew how to make what he borrowed his own, and many of his odes are so thoroughly national in character that they can have owed little except their external form to Greek sources. In his Satires, in spite of his avowed imitation of Lucilius in the beginning, his originality is far greater, and these are in reality his greatest works. While less popular with the general reader, they are of great interest for the light which they throw on Horace's life, personality, and habits, as well as for the vivid pictures which they set before us of the complex Roman life. In his daily walks about the city, Horace used his powers of observation, and drew material from all sides and from all classes of society. Above all we can trace in them his own self-improvement and the development of his character, and the gradual growth of that sound judgment and good taste which characterize the work of his mature years. The Satires are further characterized by a genial and good-natured humor. Like Dickens, he chose appropriate names for many of his characters—such as *Novius*, or Newman, for the parvenu, though, like those of Dickens, they were not always of his own coinage. The Satires also abound in the familiar phrases of every-day life, in puns and plays upon words, in proverbs and homely fables and stories.

Horace's works, as he himself humorously predicted, became school text-books at an early period. Juvenal implies that this was the case in his day. This fact and his general popularity led to the numerous commentaries on his works, which began to appear as early as the days of Nero, of which those of Porphyrio, of the early part of the 3d century, and the collection falsely attributed to Helenius Acron, have come down to us. The great number of manuscripts which exists testifies to his popularity in the Middle Ages. His fame at that time was, however, much less than that of Vergil, and, though he also was regarded as a magician, it was only at Palestrina and at Venusia that such legends were current. In modern times his influence on French and English satire has been great, as well as on modern poetry in general.

The date of the first edition is uncertain, but is earlier than 1471. Since then the editions of Horace's works, or of parts of them, have been legion. Of these may be mentioned as epoch-making that of Richard Bentley (Cambridge 1711), which has often been reprinted (the reprint at Berlin in 1869 contains a word-index by C. Zangermeister). The standard critical text is that of O. Keller and A. Holder (Leipzig 1864-70, a second edition of the first volume containing the 'Odes,' 'Epodes,' and 'Carmen Sæculare,' appearing in 1899). A commentary on this edition is furnished by Keller's 'Epilegomena zu Horaz' (Leipzig 1879-80).

Of editions with notes may be mentioned: J. G. Orelli, 4th ed. by W. Hirschfelder and W. Mewes (Berlin 1886-92), containing a complete word-index; A. Kiessling (Berlin, 2d ed. 1890-8); H. Schutz (Berlin 1880-3); these two appear in new editions from time to time; L. Müller, 'Odes' (Leipzig 1900), 'Satires and Epistles' (Leipzig 1891-3); E. C. Wickham, 'Odes and Epodes' (3d ed. Oxford 1896), 'Satires and Epistles' (Oxford 1891); Page, Palmer, and Wilkins (London and New York 1896). The edition of the 'Odes and Epodes' by P. Shorey (New York 1896) is of special interest to the general reader on account of its large number of parallel passages from English poetry.

The simplicity and directness of Horace's thought have been a constant temptation to translators, and the number of English versions, particularly of the 'Odes,' is very great. But his care in composition and his inimitable skill in the use of words, his *curiosa felicitas*, as Petronius terms it, make him exceedingly difficult to translate, and, while some brilliant successes have been achieved with single odes, no one has done justice to him as a whole. Many of the attempts which have been made are reviewed in two articles in the 'Quarterly Review' (Vol. CIV., 1858, and Vol. CLXXX., 1895). The following may be mentioned: Lord Lytton, 'Odes and Epodes' (London 1869); Cooper, 'Horace's Odes Englished and Imitated by Various Hands' (London 1880); Martin, 'Works of Horace' (Edinburgh 1888); Conington, 'Odes and Epodes' (3d ed., London 1885), 'Satires and Epistles' (London 1892); Gladstone, 'Odes' (New York 1894); Green, 'Odes and Epodes' (London 1904). An edition of Horace's works, in six volumes, containing both text and translations, has recently been issued by the Bibliophile Society of Boston. To give an adequate literary criticism of Horace is nearly as difficult as to translate him, and is out of the question within the limits of a brief article. Consult: the various histories of Roman literature, especially that of Mackail (New York 1900); Sellar, 'Roman Poets of the Augustan Age—Horace and the Elegiac Poets' (London 1892); Nettleship, 'Lectures and Essays' (Oxford 1885); Patin, 'Études sur la poésie latine' (3d ed., Paris 1883); Tyrrell, 'Latin Poetry' (Boston 1895); Boissier, 'The Country of Horace and Virgil' (London 1896); Lang, 'Letters to Dead Authors' (London 1886).

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HORÆ, hō-rē, in Greek mythology, goddesses of the seasons. They were generally regarded as attendants of the gods, and guardians of the Olympian gates. Their characteristics, however, varied, and their number was variously represented as two, three, or four. Hesoid names three—Euxomia (good order), Dike (justice), and Eirene (peace), and thus makes prominent their attributes as also guardians of social and political conditions.

HORATII, hō-rā'shī-i, three Roman brothers, who, in the reign of Tullus Hostilius, engaged the same number of Alban brothers (the Curiatii), in order to decide the contest between the two nations. A sister of the Horatii was

HOREB — HORN

betrothed to one of the Curiatii; but both sides forgot their private relations in the service of their country. Two of the Romans soon fell. The contest was unequal, but Horatius saw his antagonists faint with the loss of blood. In order therefore to separate them from one another, he feigned flight, and, while they pursued him as well as their wounds would permit, at unequal distances, he suddenly turned and slew one after the other. He was conducted back to the city amidst the rejoicings of the Romans, adorned with the spoils of the slain. There he saw, in the crowd, his sister in tears for the death of her betrothed. Angered that her lamentations for her lover should mingle with the rejoicings of the nation on his victory, the brother plunged his dagger into her breast. He was condemned by the duumviri to be scourged to death, but he was later pardoned.

Horeb, hō'rēb, a mountain in the northern part of Arabia, of the same ridge as Mount Sinai, which lies not far distant from it, memorable in the history of Moses. The monks on Mount Sinai still point out the rock on Horeb from which water issued at the blow of Moses.

Horicon, hōr'ī-kōn. See **GEORGE, LAKE**.

Horizon. In its most familiar sense the horizon is the line or circle around which earth and sky seem to meet. On the ocean this circle is smooth and easily visible, and is then called the *sea horizon*.

In astronomy the horizon is defined by a plane at right angles to the direction of gravity, extending out indefinitely on all sides, and called the *plane of the horizon*. The circle in which this plane cuts the celestial sphere is called the *astronomical horizon*. All points of it are apparently on a level with the eye of the observer. Owing to the rotundity of the earth

be drawn from the eye, the angle A E H is then the geometric dip of the horizon. The geometer will readily see that this is equal to the angle at the surface of the earth between O and H. Since one minute of arc in the curvature of the earth's surface corresponds to one nautical mile, it follows that, geometrically, the dip of the horizon in minutes is equal to its distance in nautical miles. But, in the actual case, the line of sight is curved in consequence of the refraction of the air. The result of this is that the actual horizon is further than given by the geometric theory, and the dip somewhat smaller. The following table shows the relation between the apparent dip and the height of the eye above the water and the distance of the sea horizon.

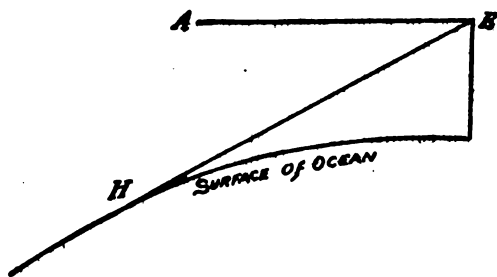
Height in Feet	Dip, of Horizon	Distance of Horizon Miles
1	1.0	1.3
2	1.4	1.8
3	1.7	2.3
4	2.0	2.6
9	2.9	4.0
16	3.9	5.3
25	4.9	6.6

On board a steamship the eye of an observer on the promenade deck is generally from 15 to 20 feet above the water. It follows that the distance of the horizon is about five miles. A ship farther away than this will have more or less of her hull below the horizon. At double the distance the entire hull will be below the horizon, and only smokepipe and masts visible. As she goes yet further, these also will disappear, as if sinking below the water.

SIMON NEWCOMB.

Horn, a tough, flexible, semi-transparent substance derived from the epidermis, which may be developed morbidly as a corn, or naturally, as in the callosities on the legs of a horse; or in connection with important functions, as when it forms the outer sheath of the outgrowths upon the heads of ungulate animals, called "horns," the "shell" of the tortoise, the nails, claws, and hoofs of animals, the beak of bird and turtle; and the hairs and feathers of mammals and birds, or their modification into spurs, scales, spines, bristles, whalebone, nasal horns, etc. This epidermal tissue consists largely of keratin, an albuminoid composed mainly of carbon (about one half), oxygen, nitrogen, and sulphur.

The horns of mammals are in effect modifications of the hairy integument covering parts liable to great wear, or needing to be hard and sharp, especially the outgrowths of the skull characteristic of male ruminants. Hollow horns are usually unbranched and persistent, but in the pronghorn (q.v.) they are shed annually while the bony cores grow and their vascular coverings persist and give rise to the new horns. Hollow horns are found usually in both sexes, but in some genera of antelopes only in the male. In the pronghorn the horns of the female are almost hidden in the hair of the head, and are small, short, and unbranched. Such horns as these are called hollow or sheath horns, and are very different from antlers (q.v.). Another form of true horn is that on the snout of the rhinoceros (q.v.) where, when more than one appears, the projections stand one behind the



the sea horizon is lower than this astronomical horizon—a narrow strip of sky separating the two. The angular distance between them is called the *dip of the horizon*. The higher the observer is above the ocean, the greater is the dip. To an eye on the surface of the water, the sea horizon and the astronomical horizon coincide, so that there is no dip. The geometrical principle which determines both the dip and the distance of the visible horizon, are seen in the figure. The circular arc is here the surface of the ocean. The eye of the observer is situated at the point E, a short distance above the surface of the water. A tangent drawn from the eye to the surface meets the latter at the visible horizon, H. Let a horizontal line E A

HORN—HORNBILL

other in a median line, and not side by side. This nasal rhinoceros-horn is not a hollow sheath clothing a bony core, but a solid mass of coarse agglutinated hairs, arising from the skin and supported by a thickening of the underlying bone.

Utility of Horn.—In their natural form, the horn-sheaths of oxen, sheep and antelopes have been put to a great variety of use, as weapons, receptacles, handles, and musical instruments—the latter surviving in certain ceremonial usages and in the general term "horn" for a wind instrument. Cleaned and polished it served many additional needs, forming the primitive drinking cups; and it is from this ancient usage that the general name of "horns" has been given to a species of drinking cup, and its spirituous contents. The horns of victims sacrificed to the gods were often gilded by the Romans and suspended in the temples, more especially in those of Apollo and Diana. From the most remote times the altars of the heathen divinities were likewise embellished with horns, and such as fled thither to seek an asylum embraced them. Originally the horns were doubtless symbolical of power and dignity, since they are the principal feature of gracefulness in some animals, and instrument of strength in others. Hence these ornaments were frequently bestowed in imagination and art upon gods, and were actually worn by heroes. In more modern times ox-horns have been used the world over for carrying gunpowder; and museums abound in quaint relics of this kind elaborately ornamented by soldiers and hunters. Small bottles (ink-horns) of this substance were the first receptacles for ink, and are still used in the East, where opium for smoking is usually kept in horn-boxes. Before the general adoption of glass panes in windows thin plates of horn were often used, as they still are in barbarous parts of Asia; lanterns were made of them; and the faces of the mediæval horn-books were so protected. The material now lends itself to manufacturing into many other articles by reason of its toughness, pliability and capability of being softened by heat and then molded. The heat is applied in the form of hot water; and splitting into thin sheets, or welding pieces together, or molding fragments into various forms, may all be accomplished under combined moisture, heat and pressure. Both the natural horn and the molded substance may be carved, or impressed with a die, polished and dyed. Hence an enormous variety of useful and ornamental articles may be made, and the horns of cattle have commercial value.

Horn, a musical instrument, originally formed, as the name denotes, from the horn of an animal. The name includes a large family of wind-instruments, many of which have fallen into disuse. The hunting-horn was long the chief form extant. The French horn consists of a metallic tube of about 10 feet in length, very narrow at top, bent into rings, and gradually widening toward the end whence the sound issues, called the bell, or in French the *pavillon*. It is blown through a cup-shaped mouth-piece of brass or silver, and the sounds are regulated by the player's lips, the pressure of his breath, and by the insertion of the hand in the bell of the instrument. The compass of the instrument

is three octaves. Music for the horn is always written on the key of C, an octave higher than it is played, with the key of the composition marked at the beginning of each movement. Great improvements have been made in the instrument by C. J. Sax of Paris, whose saxhorn gives a greater volume of sound than the old instrument. The buglehorn is a tube of 3 feet 10 inches in length bent into small compass. It is usually provided with keys, and has a range of two octaves, and notes commencing with the upper B of the bass clef.

Horn, Cape. See CAPE HORN.

Horn-fly, a European fly (*Hamatobia ser-rata*), since about 1890 become widespread in North America, which have a curious habit of clustering in masses about the base of the horns of cattle. It is closely related to the house-fly and stable-fly, and although annoying does no serious harm to the cattle or their horns.

Horn'aday, William Temple, American naturalist: b. Plainfield, Ind., 1 Dec. 1854. He studied zoology and in 1875-9 visited as a zoological collector South American countries, India, Ceylon, the Malay Peninsula, and islands. In 1882-90 he was chief taxidermist of the United States National Museum, and in 1896 was appointed director of the New York Zoological Park. His publications are: 'Two Years in the Jungle' (1885); 'Free Rum on the Congo' (1887); 'The Extinction of the American Bison' (1887); 'Taxidermy and Zoological Collecting' (1892); 'The Man who Became a Savage' (1895).

Horn'beam (*Carpinus*), a genus of trees of the natural order *Cupulifera*, of which the species *C. betulus* is common in Europe, in some places growing to nearly 100 feet in height, although in Great Britain, where it is much planted, it is a small tree. It is also called horn-beech, hardbeam, and yoke-elm. It has barren flowers in a cylindrical catkin; fertile flowers in a lax catkin; nuts in pairs. It grows in woods and hedges, often in a damp tenacious soil, and forms a principal part of the ancient forests on the north and east sides of London. The wood is white, tough, and hard, and burns like a candle. It is used in turnery, for cogs of wheels, etc. The inner bark yields a yellow dye. The American hornbeam (*Caprinus Americana* or *Caroliniana*) is a small tree rarely attaining the height of 30 feet, sparingly diffused over most of the United States. It is also called water-beech, blue beech and ironwood. The wood, fine-grained, tenacious, and very compact, is used for handles, as of carpenter's tools, etc., its serviceability being restricted by reason of its inferior size. See IRONWOOD.

Horn'bill, a genus (*Buceros*) and of a family (*Bucerotidae*) of birds now placed in the division *Coraciiformes*, and related to the hoopoes and owls. The species are numerous, and are found in Africa, India, and throughout the Malayan region as far as New Guinea, are mostly large birds, the largest being more than four feet long, the smallest rather smaller than a magpie. They are bulky birds of heavy, noisy flight; their large bills are surmounted by bony crests or "helmets" of varied shape and sometimes of great size, but rendered light by the presence of numerous air-cells. Their food

HORNBLLENDE—HORNELLVILLE

is principally fruits, but in certain circumstances they become to a great extent omnivorous. Thus a well-known South African ground-hornbill devours snakes, and is highly regarded by the negroes because of its enmity to them, and ability to overcome the largest and deadliest vipers. Several are mainly terrestrial in their habits. The most curious fact regarding these birds is that during the breeding season the female is imprisoned on her nest in a cavity in a tree-trunk, she herself apparently gradually plastering up the entrance by the use of her excrements, until there is left only a small aperture through which the male supplies her and her offspring with food until the young ones are nearly full grown. In captivity the male bird has been observed to disgorge at intervals the lining of his gizzard in the form of a bag, and it is supposed that the food supplied to the female during her term of captivity in the breeding season is enclosed in this structure. Consult: Newton, 'Dictionary of Birds' (1896).

Hornblende, hör'nblënd, or **Amphibole**, an abundant and widely diffused mineral, remarkable on account of the various forms and chemical compositions that it exhibits, and its diversified colors. Almost numberless varieties of it are recognized, to many of which distinct names have been given. It crystallizes in the monoclinic system, and is brittle, with a hardness of from 5 to 6 and a specific gravity of from 2.9 to 3.4, according to its composition. It has a vitreous or pearly lustre, and its fibrous varieties often have a silky appearance. The variety most commonly known as "hornblende" is usually black or greenish black, and occurs in many rock formations, notably in granites and basalts, and in certain schists and slates. The strongly colored varieties are pleochroic. Common hornblende is a silicate of iron, aluminum, magnesium and calcium. The various hornblende minerals are now collectively known as the "amphibole group." See AMPHIBOLE.

Hornbook, an elementary school book in use in England down to the time of George II. It was made up of a single leaf on which was written the alphabet in large and small letters; the Roman numerals, and the Lord's Prayer. The leaf was sometimes set in a frame and sometimes pasted against a piece of sliced transparent horn; hence the name. There was a handle through which a string was inserted whereby the book might be tied around the waist.

Horne, C. Silvester, English Congregational clergyman: b. Sussex 1865. He was educated at Glasgow University and Mansfield College, Oxford, and after leaving the latter institution was pastor of the Kensington Congregational Church until 1903, when he became pastor of the Whitefield Tabernacle in Tottenham Court Road, London. He has been active in many social and religious enterprises and is one of the most prominent men in his denomination in England. He has published 'History of the Free Churches.'

Horne, Richard Henry, or **Hengist**, English poet and essayist: b. London 1 Jan. 1803; d. Margate 13 March 1884. He was educated at Sandhurst, and entered the Mexican navy as midshipman, serving till the close of the

Mexican war of independence. He then returned to London to begin a literary career. To his early period belong two tragedies, 'Cosmo de' Medici' (1837), and 'The Death of Marlowe' (1837), both of which contain fine passages. A poem sent to him for criticism by Elizabeth Barrett opened the way to a cordial friendship and a correspondence of seven years. In 1852 Horne removed to Australia, and remained there until 1866; his book, 'Australian Facts and Principles,' being one outcome of this residence. Again returning to England, he continued literary work until his death. His last publications were tragedies, including 'Judas Iscariot: A Miracle-Play' (1848), and a curious prose tract, 'Sithron the Star-Stricken' (1883), which he pretended to take from the Arabian. His best known work, however, is his epic poem 'Orion' which Poe said might be called "a homily against supineness and apathy in the cause of human progress, and in favor of energetic action for the good of the race."

Horned Dace, **Rattlesnake**, **Screamer**, **Viper**, etc. See DACE, RATTLESNAKE.

Horned Toad, lizards of the family *Iguanida*, popularly called toads from a certain general resemblance in form and manner to those animals. The body and head are broad, thick, and flattened, the tail short and the usual attitude a sort of squatting posture with the head elevated. About a dozen species of the genus *Phrynosoma* occur in the arid parts of the southwestern United States and in Mexico. The best known are *P. cornutum* and *P. coronatum*, which, because of the bizarre appearance, quaint ways and tolerance of captivity, are often brought back as souvenirs by visitors to those regions. The scales on the body bear prominent conical spines, and the long horns of the head are supported by bony cores. Their mottled brown and gray colors harmonize well with their natural surroundings. The horned toads love to bask in the sunshine in the hottest weather and to bury themselves in the burning sand. Never very active, they become extremely sluggish in cool or dull weather and hibernate in the winter. They feed on all kinds of insects, for which they search only during the hottest hours of the day, and drink copiously of water when sprinkled in the form of drops. Like many other lizards, but unlike most of the *Iguanida*, they are viviparous.

Horned Viper. See VIPER.

Hornellsville, hör'nělz-vil, N. Y., city in Steuben County; on the Canisteo River, and on the Erie and the Central N. Y. & W. R.R.'s; about 57 miles south of Rochester and 46 miles northwest of Elmira. The first settlement was made in 1790, but it was a part of Canisteo and was called Upper Canisteo until 1820. The present name was given in honor of George Hornell, who had done much for the early development of the town. It was incorporated as a city in 1890. Hornellsville is situated in a fertile agricultural region, noted for fruit. Its chief manufactures are sash, doors, and blinds, railroad supplies, furniture, leather, carriages and wagons, silk, bricks, tiles, wire-fencings, gloves, and agricultural implements. It has a good public high school, St. Ann's Academy, St. James Mercy Hospital, and a number of fine

public and private buildings. The government is vested in a mayor, who holds office two years, and a city council. The subordinate officers are appointed by the mayor subject to confirmation by the council. Pop. (1910) 13,617.

Horner, William George, English algebraist: b. 1786; d. Bath, 22 Sept. 1837. He was educated at a private school near Bristol, and later taught there, becoming head master in 1806. In 1809 he established a school at Bath, which he conducted until the time of his death. His only work of importance was his discovery of a method of solving numerical equations of any degree, which he first announced in a paper read before the Royal Society in 1819, and afterward published in the 'Philosophical Transactions.' The method is still in use, and is known by Horner's name. See ALGEBRA, HISTORY OF THE ELEMENTS OF.

Hornet. The true hornet is a European wasp (*Vespa crabro*); but in America the term is applied to almost any form of large stinging wasp, especially such as make papery nests. In some portions of the United States this is considered the only "hornet," but in the vicinity of New York the European hornet also occurs; and southward a somewhat smaller species (*V. carolina*) goes by this name.

Hornet, The, the name of two sloop-of-war in the American navy during the War of 1812. The chief was a ship-rigged 18-gun sloop, and did brilliant service. Through December and January 1812-13, under Master-Commandant James Lawrence, she blockaded the 20-gun English sloop *Bonne Citoyenne* in the harbor of Bahia, Brazil, till overmatched by a 74; Lawrence was surprised and himself had to take refuge in the harbor, but instead of being blockaded, slipped out the next night under the very guns of the man-of-war. After capturing a merchantman, on 24 February he fell in with the English sloop-of-war *Peacock*, Capt. William Peake, each at this time having 20 guns; they engaged at 5.25 P.M., and in eleven minutes the *Peacock* was a sinking wreck and surrendered. Her captors made every effort to keep her afloat, but in a few minutes she sank, carrying down 13 of her own crew and three of the *Hornet*'s. Peake and four men were killed and three wounded; the *Hornet* had one killed and two wounded, besides two more hurt by an exploding cartridge. "A vessel moored for the purposes of experiment could not have been sunk sooner," said an English paper of the time; "it will not do for our vessels to fight theirs single-handed." On 22 Jan. 1815, under Capt. James Biddle, she encountered off Tristan d'Acumha, in the South Atlantic, the English brig *Penguin*, Capt. James Dickinson, with 19 guns of about the same metal as her own 20; in 22 minutes the *Penguin* surrendered, but on Biddle going forward, two British seamen shot him in the neck (not vitally), and were immediately shot down themselves. The *Penguin* lost her captain and 9 others killed, and 38 wounded; the *Hornet*, one killed and 11 wounded. The *Penguin* was shot to pieces, and could not be taken away, so she was scuttled; the *Hornet* was almost uninjured. On 28-9 April she had a long chase from the British ship of the line *Cornwallis*, the rear-admiral's flagship, and only escaped by thoroughly dismantling herself.

Horology. See CLOCK; CLOCK-WORK.

Horoscope. See ASTROLOGY.

Horrocks, hör'òks, Jeremiah, English astronomer: b. Toxteth, near Liverpool, about 1617; d. 3 Jan. 1641. He was educated at Cambridge and was appointed in 1639 to the curacy of Hoole, Lancashire, and in that village made his famous observation (24 Nov. 1639, O. S.) of the transit of Venus, the first on record. Newton, in the 'Principia,' bears honorable testimony to the value of Horrocks' astronomical work. The observation of the transit is by no means regarded as his sole astronomical achievement, as he added to our knowledge of the physical cause of celestial motions, deduced the solar parallax, corrected the solar diameter, and made tidal observations. Hevelius printed the 'Venus in Sole Visa,' which was first published in Germany (1662); a translation of this work, with memoir by Whatton, appeared in 1859.

Horschelt, Theodor, German painter: b. Munich 1829; d. 1871. He began his early studies in the Munich Academy, and later became a pupil of Albrecht Adam. At first he painted horses, among which is 'The Poacher' (1850), and then turned to military scenes, painting 'The Seizure of Shamyl' and 'Cossacks Returning from a Razzia.'

Horse, in a general sense, a member of the ungulate family *Equidae* (q.v.); but in ordinary use the word designates the single domestic species (*Equus caballus*), the wild original of which is unknown. It is not decided, in fact, whether a single species, or more than one, was the source, nor where the domestication of the horse was first effected. The evolution of the species, elsewhere sketched, took place in the American continent, and the writings of some of the earliest voyagers to the eastern coast of South America contain allusions which some commentators regard as evidence that horses survived and were known to the people who occupied the La Plata valley at that time, but this is open to doubt. It is probable that at the dawn of civilization the wild ancestors of our modern horses roamed in bands over the whole extent of grassy uplands stretching from northern Africa to eastern Manchuria, on the steppes of Russia, and wherever in Europe open country might be found; and it is also probable that they were among the first animals which men killed for food and afterward captured and tamed in order to keep a supply of food under control. This act must have been one of the earliest steps toward community life and civilization. The oldest paintings and carvings left by the ancient inhabitants of the valley of the Euphrates show that saddle-horses were familiar to them; and it is fair to suppose that the supremacy primitively gained by the people of central Asia over other parts of the world was largely due to their use of horses in war, giving them a great advantage over unmounted tribes; but it was not until much later—probably no earlier than 2000 B.C.—that the animal came into use in Arabia and Egypt, where before had been only camels and asses. So far as can be judged, these early Assyrian war-horses were rather small, robust, large-headed and shaggy beasts, much like Przewalsky's horse or the kiang (q.v.). A very similar animal was domesticated by the men of the Polished Stone Age in Europe, excellent portraits of which

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were etched by neolithic artists upon pieces of bone, and have come down to us among the contents of graves opened by archæologists in France, Switzerland and elsewhere. Later, but still in the prehistoric period, Europe was repeatedly invaded by Asiatic hosts who brought with them eastern horses. These modified, if they did not supersede, the local stock. When Rome conquered the barbarous inhabitants of Europe its horses, which were of Asiatic stock, with perhaps some African mixture, largely superseded those of the conquered tribes, and from the mingling there sprang the big heavy breeds which characterized the Middle Ages, and were intended for strength and weight-carrying, rather than for nimbleness and speed. It was not until near the end of the 17th century that the introduction into France and England of certain sires of Arabian breed—a clean-limbed, small-headed, agile, hardy race, which arose in Arabia and Palestine about 2,000 years ago—began the improvement of British stock, which has reached its highest development in the modern European racehorse, hunter and hackney. From this stock was derived the American horses which have been perfected in at least one new direction—that of the trotter.

Horse, Care and Diseases of the. *Breeding.*—As heredity is the basis of all permanence in breeding, and variation the condition of advancement, we can, under intelligent selection, environment, and control, attain to a constant improvement. In selecting horses for breeding, certain leading principles must guide. These may be shortly stated as: (1) adaptability to the use of the breed; (2) quality, style; (3) strength, endurance; (4) good conformation; (5) good constitution; (6) good pedigree; (7) prepotency; (8) no violent crossing of equally prepotent animals; cross the desirable prepotent animal on a non-prepotent cross-bred animal; (9) a speedy amelioration of a large number is most certainly obtained through a prepotent stallion, which leaves a large number of his offspring every year; (10) sound, vigorous health; the prepotent parent must be at his best, and no non-prepotent one should be bred to him, none that is old, feeble, or reduced by disease, overwork, underfeeding, etc; the lack of prepotency will not prevent the transmission of the systemic weakness to the offspring; (11) secure an environment calculated to enhance the qualities we seek in the progeny. Systematic exercise that is not exhausting, generous tissue forming, but not fat forming regimen, and pure, dry, genial but bracing air are especially important.

Contagion Through Sexual Congress.—Many maladies may be transmitted during coition, but some are especially liable to be so. Dourine, glanders, genital eczema, contagious acne, horse-pox, mange, and contagious abortion are to be specially guarded against. Some, like strangles, influenza, and contagious pneumonia, may be transmitted by an animal that has already passed through the disease and acquired immunity. Special care, therefore, or even veterinary supervision of horses devoted to breeding is a desideratum.

Care of the Pregnant Mare.—Exercise is a valuable provision too often neglected. Free range on breeding ranches, or, for valuable mares, separate paddocks, secure this, while

working mares are better to continue the work, provided it is not unduly straining nor jarring, nor productive of excessive fatigue, exhaustion, or debility. This maintains appetite, digestion, assimilation, muscular tone, and vigor, favors the development of a stronger, better foal, and keeps the dam fitter for foaling and nursing. Feed well, avoiding what is hard of digestion, or liable to cause impaction, indigestion, fermentation, or, above all else, diarrhoea. On good pasture grain may be omitted, unless in the last month of gestation, or if the mare is visibly running down. Good, clear, sound oats or barley, or bran mash with some boiled flaxseed may be given, and heating agents like maize, buckwheat, or wheat avoided. During gestation, violent purgatives and active diuretics are liable to bring on abortion.

Care of the Foal.—To avoid danger to both mare and foal in parturition, provide a roomy box-stall with door opening outward, or a paddock. The foal born indoors is always in danger of infection through the raw surface of the navel. The common or box-stall swarming with microbes is more to be dreaded than exposure to storms outside. When severe weather forbids foaling outdoors, the box should be thoroughly cleansed, disinfected, and whitewashed to obviate this danger. Navel infection may cause simple inflammation, swelling, and abscess, or the germ may propagate itself through the inactive umbilical vein to the liver, causing infective hepatitis with abscesses or necrosis; or, reaching the bowels, it causes infective diarrhoea (white scour); or it may colonize the joints, as infective arthritis (joint ill); or again it may cause pneumonia, or multiple abscesses in different organs. The gravity of the resulting disease varies with the infection, and a deadly germ, located in a stable, is liable to attack all foals that come later in the season. Both stable and navel should be disinfected. The foal should be delivered on clean straw, which may be sprinkled with carbolic acid. The navel-string may be severed with an emasculator previously cleaned and boiled, or tied with a carbolized new cord painted with tincture of iodine, and, when dry, dusted with tannic acid impregnated with iodine and carbolic acid.

The new-born foal may have the back (flexor) tendons contracted so as to stand over at the knee and fetlock, and in the worst cases the extensor pedis tendon, the opponent of these, is found to be divided across and the muscle wasted and degenerated. A succession of such cases in the same stable suggests infection. Slight cases will recover under splints and bandages, while for more severe ones an aseptic surgical operation may be required. The foal should have the first milk (*colostrum*) to clear away tenacious bowel contents and prepare for healthy function. A mild laxative of raw linseed or olive oil may be requisite in the absence of colostrum. In the absence of the dam's milk the foal may be raised on cow's milk reduced by adding one third boiled water and sugar to sweeten. After two or three weeks the undiluted cow's milk may be allowed. The cow should be free from tuberculosis.

For the pure bred racer or trotter the foal should have half a pint of oats daily at a month old, to be increased with his growth. Even draft breeds are benefited by such early grain-feeding.

Exercise is essential to the growing foal. The quality of bone, muscle, brain, and other parts depends largely on physiological use, and rich blood, active digestion, and assimilation, vigorous health, strength and endurance are incompatible with confinement and inactivity. This may at first be secured by freedom to play in pasture, or by careful handling and training by a judicious manager. But to put the two-year-old into a severely contested race, or full training, or to devote the draft colt to regular work, is but to invite disaster. The bones are as yet too soft, they contain too much organic matter and too little mineral, the muscles lack firmness and power of endurance, the whole system is immature and imperfect, and overtaxing exhausts or deranges the functions, and direct injury or impaired development is the natural result.

CARE OF THE FEET.

Overgrown Hoofs.—With unlimited exercise on firm ground, the unshod foot is sufficiently worn down, but when confined for months indoors or in a limited straw yard overgrowth occurs, especially at the toe, and a dangerously increased strain is thrown on the joints, ligaments, and back tendons. Distorted and twisted feet, bruises of the sole by the ingrowing heels and quarters, ringbones, ossified cartilages, sprains of the flexor tendons, and diseases of the fetlock, pastern, and coffin joints are common, and irreparable results. The feet exposed to this should be frequently pared and adjusted. Remove excess of toe, reduce and balance the inner and outer sides of the wall, file or cut to the level the incurving heels and quarters, and round off the sharp outer edge of the hoof. Dry, imprisoned plates of horn pressing up on the sole must be set free and removed. But do not file the surface of the hoof-wall. This removes nature's protective covering and exposes open horn tubes to exhale moisture, and conduces to dryness, brittleness, shrinking, compression, and inflammation of the sensitive parts, atrophy, and lameness.

Defective Growth of Hoof.—Imperfect growth of hoof may arise from shoeing, pinching, filing, paring, etc., to excess, but also from compulsory idleness. The circulation inside the hoof is greatly accelerated by the ascent and descent of the foot within the horny box in action, and a free blood supply in a healthy tissue favors growth. Life at pasture on firm ground tends to abundant, strong, tough, durable hoof, while close confinement in a stall makes for a thin, friable, brittle, and shrunken horny covering. Constant soaking in water softens the hoof, reducing its tenacity, and tending to flattening of both wall and sole. The Belgian and other horses bred on wet, swampy ground generally show large, flat, pliant, and most undesirable hoofs. Such feet are especially liable to thrush, canker, corns, bruises, grease, and laminitis. Feet habitually resting on piles of reeking manure in stalls, sheds, or yards suffer the additional injury of softening and disintegration from the ammonia gas, and attacks by the swarming putrefying microbes which abound in such material.

Good hoofs, beside use and care, depend on generous living. The fuller growth on the spring and summer grass, forming a permanent ring, illustrates this. Daily washing of the hoof

is important, and a subsequent smearing with an ointment of tar and vaseline or oil is useful in preserving the natural moisture and preventing the attacks of microbes.

Shoeing.—For good feet, shoes may be dispensed with on soft ground or mud roads, but they become necessary on hard roads and for hard-worked animals. Tips, extending back to the broadest part of the foot only, are the least objectionable. Full sized shoes are too often made to pinch, distort, bruise, or injure the foot beyond repair; and a poor foot is as injurious to a horse as an unstable foundation to a building. The first consideration is the preparation of the foot, giving due balance to heel and toe, inner side and outer, sole and wall, heel and bars. While removing all overgrown wall and bars, and all sole-plates that have become detached from the tough living horn beneath and now act as foreign bodies, the tough horn itself should not be exposed, nor removed except as a thin margin around the outer edge, where it is smoothed to the same level as the wall, to which it acts as a support, and the bearing surface of which for the shoe it slightly extends. The outer surface of the wall must be spared abrasion by the file, with consequent drying and contracting as already noticed. Shoes should be removed and reset every four weeks at the utmost, to avoid pinching, setting in, bruising, and other injuries. Intelligent shoeing, conserving the feet, goes far to obviate diseases of the feet, the most common and harmful of equine diseases. Among these may be specially named corns, bruises, pricks, quittors, sandcracks, thrush, canker, sidebones, laminitis, navicular disease, contracted hoof, cleft hoof, dry hoof, crooked hoof, loose wall, hollow wall and graveling. As the integrity and easy normal function of the foot is further one of the best means of protection against distortions and diseases of the various joints of the limb, it follows that the preservation of sound feet by good shoeing and intelligent care is one of the greatest desiderata in horse management.

FEEDING AND DIGESTIVE DISORDERS.

The natural food of the horse is grass and though charged with excess of water, and at first liable to scour, and always to cause flaccid muscles and lack of energy and endurance, yet a run at pasture, with pure air, normal, easy exercise, and stimulation of stomach, liver, bowels, metabolism, and excretion will often improve or arrest infirmities of digestion, assimilation, elimination and even innervation. Heaves (broken wind), chronic bronchitis, various forms of nasal discharges, indigestion, torpid liver, gall stones, and kidney affections are examples of maladies which improve at pasture. Dried grass in the form of hay is the standard food of the domesticated horse. This is best from natural pastures with a mixture of grasses to be followed by blue grass, timothy, ryegrass, and clover, the latter being the most dangerous as a horse fed. Upland hay is more aromatic and choice than that from low, damp or irrigated meadows, and the first crop is always the best. New hay will sometimes disagree, while the old, though lacking aroma and less palatable, is less likely to cause digestive disorder. At a year old and over it is brittle, dried, more fibrous and less nutritive. Balf

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tured hay is always innutritious, and often directly poisonous, when altered by bacterial ferments, molds and their products. The results are shown in heaves, gastric disorders, liver troubles, brain affections (staggers), kidney and skin diseases. Second crop hay, clover and alfalfa hay are especially dangerous in this sense, the excess of proteids in the last two, and especially of foliage, delaying curing and favoring the multiplication of ferments. Oats are the standard grain feed for horses. But like hay they must be well matured on good soil, and well cured. Mustiness brings essentially the same evils as in hay, and newly harvested they are liable to disagree. Kiln-dried oats are to be avoided, also those that have sprouted. The composition of oats and hay shows the excess of proteids, carbohydrates and fats in the first.

with and a given weight of oats is of more value than an equal amount of similar nutritive elements in wheat or barley.

Good judgment and regularity in feeding and watering are essential to success with any feed. Feeding in irregular amounts at varying intervals, and with uncertain watering will undo the good effects of a generous ration. The small stomach (16 quarts) cannot admit a large feed of oats and saliva without suffering, and, if overdistended, it becomes paretic or torpid, and dangerous fermentation and gaseous distension may ensue. Again, if feeding is delayed the hungry craving and nervous excitement cannot be undone by a generous feed later. Then again, if the perspiring and exhausted animal is allowed to slake his thirst with a bucket of ice-cold water, he may have heart failure, or

	Water.	Proteids	Carbohydrates	Fats	Cellulose	Salts
Meadow hay	14.59	10.11	40.00	2.34	25.52	6.54
Oats	14.3	12.0	60.9	6.0	10.3	3.0
Maize	10.6	10.3	70.4	3.0	2.2	1.5

Maize is notorious for the deficiency of proteids relatively to the carbohydrates and fat. With a great excess of heat and energy producing constituents and a deficiency of earthy salts it is less calculated to foster growth and development, and predisposes rather to fat. It tends more to impactions of the bowels and indigestion, with resulting skin eruptions, and above all to the destructive recurrent inflammation of the eyes, which ruins so many young horses. Yet it is fed over large areas as the exclusive grain feed, and such is the adaptability of the living system that the minimum evil results. To obviate the evils it can be fed with cooling, laxative agents as wheat bran, carrots, or turnips, or an ounce of Glauber salts may be given daily.

Barley, rye and wheat have been successfully fed to horses but are not equal to oats in supporting the animal and fitting for hard work.

Beans, peas and other leguminous seeds are fed when a horse is subjected to an extraordinary strain of work or endurance, being especially valuable for the excess of proteids they contain. They should be thoroughly matured and dried as the fully formed and partially ripened seeds of several species contain a narcotic poison.

The relative amount of hay and oats for a horse of 1,000 pounds live weight may be stated as follows: *Cavalry horse*: Oats 12 pounds, hay 14 pounds. *Carriage horse*: Oats 10 pounds, hay 12 pounds. *Draft horse*: Oats 15 pounds, hay 12 pounds. The horse at rest can live on a mere maintenance ration sufficient to keep up bodily temperature and repair waste. A horse in active work will need about one half more. For very severe or rapid work about one third more must be added. For hard work a broad ration-proteids 1, to carbonaceous matter 6, is preferable to a narrow ration-proteids 1, to carbonaceous matter 3. An economical feed can often be made of a number of agents compounded from their known chemical composition, to form such a balanced ration, but mere chemical ingredients are not final, as palatability and adaptability have still to be reckoned

colic, or gastric congestion with sympathetic skin eruption or laminitis, or inflammation may attack any organ that has been previously weakened.

An excellent appetizing food is molasses. This has been largely neglected because of the mistaken idea that it contained heat producing elements only. But corn carbohydrates furnish energy to the acting muscles and other tissues as fuel does to an engine, and sugar, having no need of digestion, can supply force with less loss than can starch or fat. Not the least of its good qualities is the relish with which it is taken and that it imparts to other less attractive food taken with it. For the horse otherwise healthy, but debilitated by poor or faulty feeding or overwork, molasses is to be depended on to restore weight and energy alike. For this purpose it may be given in the amount of two pounds per day, and even in double that amount if subjected to severe work.

Overdistension of the Stomach.—Sudden inflation of the stomach with gas, the product of fermentation in unwholesome contents, (frosted grass, roots, apples, green potatoes, overripe ryegrass, millet, vetch, etc., irritant plants); from overfeeding (at the cornbin, in ripe grain, etc.), from violent exertion on a full stomach, or from a full feed when debilitated from starvation, disease, or overwork, is liable to cause death in two hours or a little more. The horse can rarely vomit, or belch gas, the stomach does not absorb, and the outlet by the bowels is one hundred feet long, so that the organ is usually ruptured with fatal results. Among the other less rapid disorders are catarrhal inflammation of the stomach, intestinal colic, congestion, inflammation, impaction, twisting, invagination, calculi and worms. Of poisons may be named: lead through water, etc.; molds, fungi, and bacteria in food (causing gastric, intestinal, hepatic, pulmonary, nervous, cutaneous or kidney diseases); ergot, smut (causing gastric disorder, ulcers of the mouth, abortions, etc.); lupines, Senecio Jacobaea (causing cirrhosis of liver); astragalus, oxytropis (loco, brain disease); equisetum (gastric and intestinal catarrh); to

which may be added cicuta, conium, cenanthe, aconite, rhus, ranunculus, larkspur, anemone, digitalis, wild cherry, wild onion, camas, helenium, hyacinth, clematis, thorn apple, colchicum, belladonna, hyoscyamus, bitter sweet, euphorbium, hellebore, wild parsnip, laurel, oleander, etc.

Liver Diseases.—These are notoriously prevalent in hot, damp regions in horses kept in close stables on rich, abundant feeding, in such as have dry feeding and scarcity of water in winter, and in such as have a poorly balanced ration with excess either of proteids or of heating carbohydrates. In damp tropical regions special care is needed as to the site, exposure, ventilation and purity of stables, the dietary, exercise and grooming to obviate liver complaints. Transient fevers, nervous digestion, skin and kidney disorders often originate from troubles in the liver.

Grooming is most important in the finer breeds of horses in clearing off oil and dandruff, rendering the skin pliant, and favoring secretion, exhalation, cooling and elimination. On the contrary, animals at pasture and exposed to cold and wet find a measure of protection in the sebaceous and thick hairy covering. When, however, drenched with perspiration or rain, and in a warm air, the relaxing effect on the skin and general system is very debilitating, hence clipping may become a necessity to be followed by special precautions against cold. The active friction (massage) of grooming renders circulation active, especially that of the lymph, relieving fatigue, favoring elimination and improving the tone of the muscles and general system. The heels need particular care. Clipped heels are irritated by the stubby hair in the folds back of the pastern often precipitating chaps and grease which would have been escaped in the unclipped. The heel is normally protected by the abundance of sebaceous secretion, but when this is rubbed off by dust, clay, sand, etc., the part suffers readily from cold, wet, dried gritty mud or other irritants. Washing the heels, above all with caustic soap, and leaving them to dry in cold air or draft is hurtful. Prompt drying of the heels will obviate the danger, and, if there is already any swelling, gentle massage with a little vaseline will improve the condition. In obstinate cases the source of the trouble may be sought in disorder of digestion, liver or kidney.

Many disorders of the nervous system, lungs, skin, eye and kidneys are due to constitutional troubles which cannot be dealt with here in general terms. Such diseases are usually manifested by elevated body temperature and accelerated or modified breathing or pulse. The temperature of the healthy, mature horse, at rest in a cool or moderate environment, is 99° to 100° F., respirations 10 to 12 per minute, and pulse 35 to 45.

Contagious Diseases.—These agree in one fundamental feature that each is due to a microbe, which passes more or less directly from the affected animal to the sound one, thus propagating the disease. The arrest of the epizootic and even its complete and final extinction, is merely a question of preventing such transmission and of destroying every infecting germ. This truth is not yet duly appreciated by stock-owners, legislators nor sanitary officers, but when it is fully realized we shall be near the

total extinction of most animal plagues to the unspeakable profit of humanity. The *Contagious diseases* may be divided into two classes: (1) Those in which the infection is either confined to solipeds, or mainly propagated by the equidae, so that its extinction in these would mean the final extinction of the disease, and (2) those which are propagated in other genera as well so that the extinction of the germ in other species also would be essential to its complete eradication.

To the first class belong strangles (distemper), contagious pneumonia, equine influenza, glanders, tetanus, vesicular exanthema, contagious acac, pectichial fever, gastro-enteritis of the new born, South African horse sickness, dourine, surra, Nagana, Mal de Cadéras, infectious paraplegia. The first four of these affections are constantly spread in the United States through sales, public stables, stockyards, railroad cars, ships, and salt-stables, and no radical measure is taken to destroy the germs in such infected places, or to prevent the infection of all solipeds that pass through them.

In the second class must be included: Horse-pox, contagious abortion, thrush of the mouth, infectious ophthalmia, tuberculosis, rabies, malignant oedema, anthrax and emphysematous anthrax. The first six of these are propagated more by other genera than the horse, so that the burden of the work for their extinction would have to be expended on these other classes. The last three are caused by germs which can live out of the animal body in the soil, and their extinction would involve the drainage and sanitation of the infected soils as well.

Parasitic Diseases.—A number of parasites that prey upon solipeds can live indiscriminately in other animals as well. Among these may be named the *Tricophyton* of ringworm; *Aspergillus* of pneumomycosis; *Actinomyces*: different species of wood ticks; *Dermanyssus* of poultry acariasis; *Trombidium Americanum* (and *F. Holosericum*); *Linguatula Denticulata*; *Estrongylus Gigas*; *Filaria Medinensis*; *Distoma Hepaticum* and *D. Lanceolatum*. By reason of their variety of hosts these would be less easily got rid of. But another list includes the obligate parasites which must live in the soliped at some stage or perish. These accordingly can be extinguished on the same principle as can the microbes of exclusively equine plagues. They include the larvæ of four species of bot-fly (*Cestrus Equi*, *C. Hemorrhoidalis*, *C. Pecorum* and *C. Nasalis*); three lice (*Haematopinus Macrocephalus*, *Trichodectes Pilosus*, and *Tr. Pubescens*); four mange acari (*Sarcoptes Scabiei V. Equi*, *Psoroptes Communis V. Equi*, *Symbiotes Communis V. Equi*, and *Demodex Folliculorum V. Equi*); three tapeworms (*Tamias Perfoliata*, *T. Mamillana*, and *T. Plicata*); two stomach worms (*Spiroptera Microstoma* and *Sp. Megastoma*); five intestinal worms (*Ascaris Megalocephala*, *Oxuris Curvata* and *O. Mastigodes*, *Sclerostoma Equinum* and *Sc. Tetracanthum*); one of the serous cavities (*Filaria Papillosa*); one of the lungs (*Strongylus Arnfieldi*); and four of the blood (*Filaria Hemorrhagica*, *F. Irritans*, *F. Sanguinis Equi*, and *F. Reticulata*). For the obligate parasites their extinction on the victim and his removal from the source of a fresh supply means a final extinction of the parasite.

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as the worm cannot be perpetuated without its host. In the case of worms, which survive as eggs and embryos in damp earth and water, the exclusion of solipeds for a year or two from infested stables and fields, from waters (ponds, lakes, wells, streams) that receive drainage from infested places, and from food derived from such verminous localities, entails the inevitable destruction of these parasites in such habitat outside the body. An essential condition of complete success is that the infested animals must be themselves cleared of the worms, to prevent their colonizing new places with the parasite, and, in the case of such as are entertained in the blood, or serous cavities or in cysts in the tissues, this takes time to allow of their migrating into the bowels or reaching their limit of life and perishing. The mere use of anthelmintics or vermifuges alone is no radical treatment for these parasites. A veterinary sanitation which is far reaching enough to do away for all time with the class of contagious and parasitic epizootics, is the only one worthy of twentieth century knowledge, or which will fulfill the duties of the age.

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Horse, Evolution of the. As a domestic animal the horse is to be found almost everywhere: that man can live. He is spread all over the world—from torrid to arctic climates, in all the continents, in remote oceanic islands—he is completely cosmopolitan. But as a wild animal the horse is limited to the Old World, and is found there only in the open arid or desert plains of Central Asia and Africa. There are two species in Asia, the Asiatic wild ass (*Equus hemionus*), and the little known Przewalsky's horse (*E. przewalskii*), while in Africa there are the African wild ass (*E. asinus*) and the several species of zebra (*E. zebra*, *E. burchelli*, *E. quagga*). In the Americas and Australia there are no true wild horses, the mustangs and broncos of the Western plains and South America being feral (domesticated animals run wild) and descended from the horses brought over from Europe by the early white settlers. When the Spaniards first explored the New World they found no horses on either continent. The Indians were quite unfamiliar with them and at first regarded the strange animal which the newcomers rode with wonder and terror, like that of the ancient Romans when Pyrrhus and his Greeks brought elephants to fight against them.

The horse is distinguished from all other animals now living by the fact that he has but one toe on each foot. Comparison with other animals shows that this toe is the third or middle digit of the foot. The hoof corresponds to the nail of a man or the claw of a dog or cat, and is broadened out to afford a firm, strong support on which the whole weight of the animal rests. Behind the "cannon-bone" of the foot are two slender little bones, one on each side, called *splint-bones*. These represent the second and fourth digits of other animals, but they do not show on the surface, and there is nothing like a separate toe. So that the horse may be said to be an animal that walks on its middle finger-nail, all the other fingers having disappeared.

The teeth of the horse are almost equally peculiar. The molars are long, square prisms which grow up from the gums as fast as they wear off on the crowns. Their grinding surface exhibits a peculiar and complicated pattern of edges of hard enamel between which are softer spaces composed of dentine and of a material called "cement," much like the dentine in quality but formed in a different way. The dentine is formed on the inside surfaces of the enamel while the tooth is still within the jaw-bone; the cement is deposited on the outside surfaces of the enamel after the tooth has broken through the jaw-bone and before it appears above the gums.

Various other peculiarities distinguish the horse from most other animals; some of these are shared by other hoofed animals. The two long bones of the fore-arm (*radius* and *ulna*) are separate in the greater number of animals, but in the horse, and in many other hoofed animals, they are consolidated into a single bone. The same consolidation is seen in the bones of the lower leg (*tibia* and *fibula*). The lengthening of the foot and stepping on the end of the toe raises the heel in the horse, as in many other animals, to a considerable height above the ground, where it forms the hock joint, bending backward, as the knee bends forward. In these as in various other ways the legs of the horse are especially fitted for swift running over hard and level ground, just as its teeth are for grinding the wiry grasses which grow on the open plain.

The zebra and the ass have the same peculiar structure of teeth and feet as the domestic horse, and differ only in the color of the skin, proportions of various parts of the body, etc.

Fossil Horses of the Age of Man.—In the early part of the Age of Man, or Quaternary Period, wild species of horse were to be found on every continent except Australia. Remains of these true native horses have been found buried in strata of this age in all parts of the United States, in Alaska, in Mexico, in Ecuador, Brazil and Argentina, as well as in Europe, Asia and Africa. All these horses were much like the living species, and most of them are included in the genus *Equus*. A complete skeleton of one of them (*Equus scotti*) was found by the American Museum expedition of 1899 in northern Texas. The difference between it and the domestic horse is chiefly in proportions, the skull shorter with deeper jaws, the legs rather short and feet small in proportion to the body. In these characters this fossil horse resembles an overgrown zebra rather than a domestic horse. We know nothing of its coloring. It may have been striped, and in this case would have been very zebra-like; but there are some reasons for believing that it was not prominently striped. The bones are petrified, brittle and heavy, the animal matter of the bone having entirely disappeared and having been partly replaced by mineral matter. They are not much changed in color, however, and are so perfectly preserved that they look almost like recent bone.

All the remains of these native horses which have been found in America have been petrified more or less completely; this means that they have been buried for many thousands of years, for petrification is an exceedingly slow process.

HORSE

It serves as an easy method of distinguishing them from bones of the domestic horse, found buried in the earth. These cannot in any case have been buried for more than four or five centuries, and have not had time to petrify. Remains of these fossil horses are found in various parts of the United States, chiefly on the Niobrara River in Nebraska, and in central Oregon. Many separate teeth and bones have been found in the phosphate mines near Charleston, S. C.; other specimens have come from central Florida, from southern Texas, Arizona, Kansas, Louisiana and even from Alaska. They are, in fact, so often found in deposits of rivers and lakes of the latest geological epoch (the Pleistocene) that the formation in the western United States has received the name of *Equis Beds*.

In South America, in strata of the Pleistocene Epoch, there occurs, besides several extinct species of the genus *Equus*, the *Hippidium*, a peculiar kind of horse characterized by very short legs and feet, and some peculiarities about the muzzle and the grinding teeth. The legs were hardly as long as those of a cow, while the head was as large as that of a racehorse or other small breed of the domestic horse. All these horses became extinct, both in North and South America. It may have been that they were unable to stand the cold of the winters, probably longer continued and much more severe during the Ice Age than now. It is very probable that man—the early tribes of prehistoric hunters—played a large part in extinguishing the race. The competition with the bison and the antelope, which had recently migrated to America—may have made it more difficult than formerly for the American horse to get a living. Or, finally, some unknown disease or prolonged season of drought may have exterminated the race.

In Central Asia, two wild races persist to the present day; others were domesticated by man in the earliest times, and their use in Chaldaea and Egypt for draught and riding is depicted in the ancient mural paintings. In Africa the larger species became extinct in prehistoric times, as in America, but the smaller zebras still survive in the southern part of the continent (one species, the quagga, abundant 50 years ago, is now probably extinct), and the African wild ass is found in the fauna of the northern part. The wild horse of prehistoric Europe, a small race, short-legged and shaggy-haired, was domesticated by man, a fact that is known from the rude drawings scratched on bone or ivory by men of the Neolithic or Polish Stone Age. But the domestic horse now in use is derived chiefly from the Asiatic race, although it is probable that in some breeds there is a considerable strain of this shaggy, short-legged European race, and it is possible also that African races may have been domesticated and to some extent mixed with the Asiatic species. The domesticated ass is a descendant of the African species.

The Evolution of the Horse.—The history of the evolution of the horse through the Tertiary Period or Age of Mammals affords the best known illustration in existence of the doctrine of evolution by means of natural selection and the adaptation of a race of animals to its environment. The ancestry of this family has been traced back to nearly the beginning of the Tertiary without a single important break.

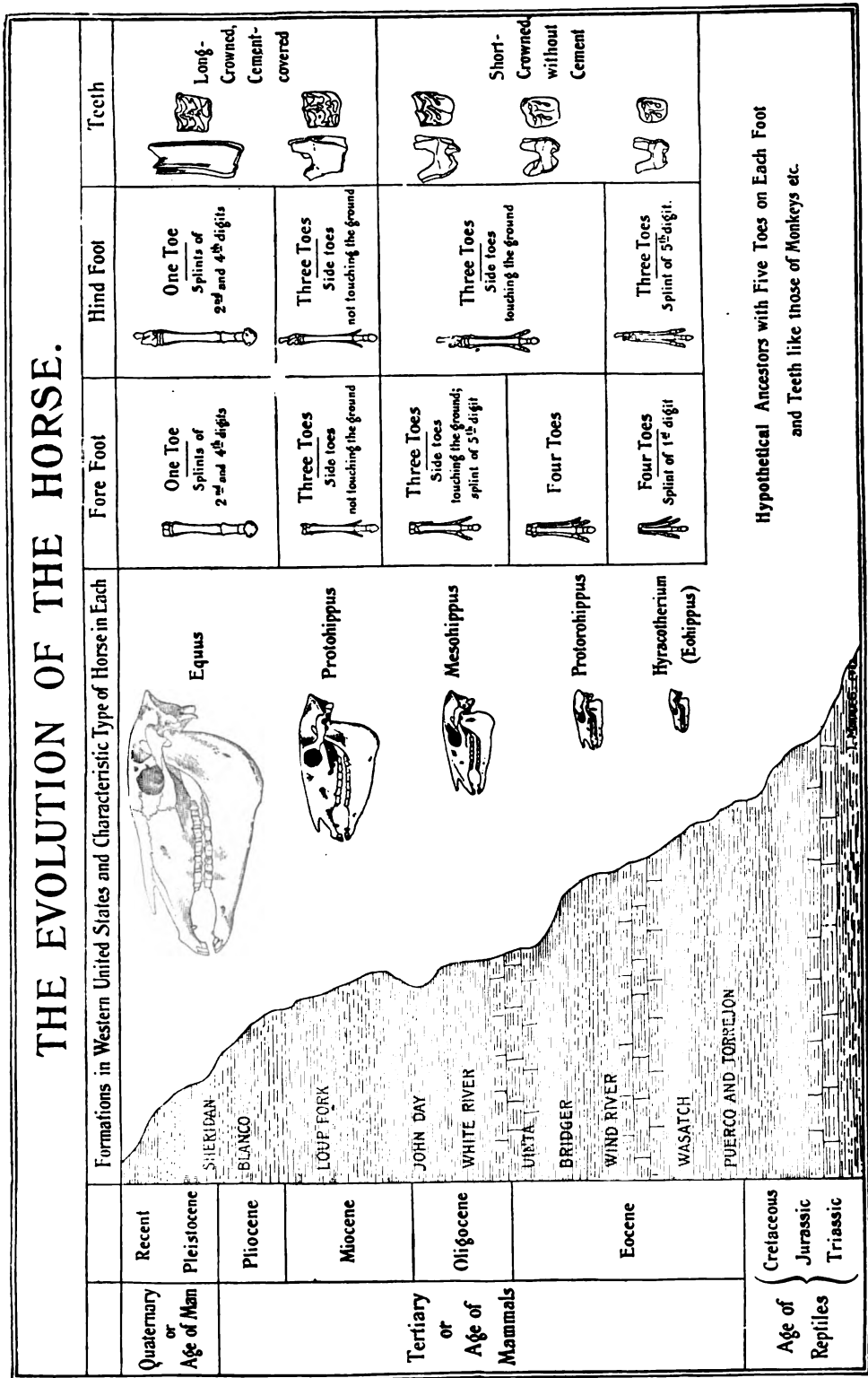
During this long period of time, estimated at nearly 3,000,000 of years, these animals passed through important changes in all parts of the body, but especially in the teeth and feet, adapting them more and more perfectly to their particular environment, namely the open plains of a great plateau region with their scanty stunted herbage, which is the natural habitat of the horse. In the series of ancestors of the horse we can trace every step in the evolution of those marked peculiarities of teeth and feet which distinguish the modern horse from an ancestor which so little suggests a horse that, when its remains were first found 40 years ago, the animal was named by the great palaeontologist Richard Owen, the *Hyracotherium* or "Coney-like Beast." Its relation to the horse was not at that time suspected by Prof. Owen, and was recognized by scientific men only when several of the intermediate stages between it and its modern descendant had been discovered. On the other hand, this first ancestor of the horse line is very difficult to distinguish from the contemporary ancestors of tapirs and rhinoceroses, and indicates how all the modern quadrupeds have diverged from a single type, each becoming adapted to the needs of its especial mode of life.

The earliest known ancestors of the horse were small animals not larger than the domestic cat, with four complete toes on each forefoot and three on each hindfoot. There is reason to believe that the still more ancient ancestors of this and all other mammals had five toes on each foot. In the forefoot of the earliest known stage we find a splint-bone or small, slender rudiment representing the missing first digit or thumb, which no longer appears on the surface of the foot, while in the hindfoot there is a similar rudiment representing the outer or fifth digit, but no trace is left of the innermost or first digit. The proportions of the skull, the short neck and arched back and the limbs of moderate length, were very little horse-like; recalling, on the contrary, some modern carnivorous animals, especially the civets (*Viverridae*). The teeth were short-crowned and covered with low rounded knobs of enamel, suggesting those of monkeys and of pigs or other omnivorous animals, but not at all like the long-crowned complicated grinders of the horse.

Commencing with the *Hyracotherium*, 12 stages have been recognized from as many successive formations, showing the gradual evolution of the race into its modern form, and each stage is characteristic of its particular geological horizon. Some of the stages have been found in several parts of the world, but by far the most complete and best known series comes from the Tertiary Bad Lands of the Western States. Besides the main line of descent which led into the modern horses, asses and zebras, there were several collateral branches which have left no descendants. Of some stages all parts of the skeleton have been found, of others, only the jaws, or jaws and feet, are known. We can mention only the more important stages.

1. The *Hyracotherium* is the most primitive stage known, but only the skull has been found, so that it has not been determined exactly what the feet were like. The teeth display six rounded knobs or cusps on the upper molars and four on the lower ones, and these are just be-

THE EVOLUTION OF THE HORSE.



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ginning to show signs of fusing into cross-crests. The premolar teeth have only one main cusp, except the third and fourth premolars (next the molars) in each jaw, which have two and three, respectively. The only specimens which have been found were in the London Clay or Lower Eocene of England and are preserved in the British Museum.

2. The *Eohippus* is much better known. It comes from the Lower Eocene of Wyoming and New Mexico, and is very like the *Hyracotherium* except that the molar teeth have the cusps more clearly fusing into cross-crests, and the last premolar is beginning to look like one of the true molars. The forefoot of this animal has four complete toes and the splint of a fifth. The hindfoot has three complete toes and the splint of another.

3. *Protorohippus*. In these animals the splint of the first digit in the forefoot and the splint of the fifth digit of the hindfoot have disappeared, but there are still four complete toes in the fore- and three in the hindfoot. The crests on the molars are a little clearer and the last premolar has become almost like the molars, while the next to the last premolar is beginning to become so. A skeleton of *Protorohippus* shows an animal of the size of a small dog, and proportioned much like the breed known as the *whippet*. The *Protorohippus* was found by Dr. J. L. Wortman in 1880 in the Wind River Bad Lands of Wyoming, and was described by Prof. Cope and others under the name of the "Four-Toed Horse."

4. Of *Orohippus* we have only parts of jaws and teeth. A specimen of the forefoot is exhibited in the Museum of Yale University.

5. *Epihippus* (Upper Eocene).—Of this stage of the evolution of the horse only incomplete specimens have been found. The molar teeth have the once round cusps almost completely converted into crescents and crests, while another tooth of the premolar series has become like the molars. The toes are still four in the forefoot and three in the hindfoot, but the central toe in each foot is becoming much larger than the side toes. (This species happens to be somewhat smaller than those found in the Middle Eocene stage, but no doubt there were others of larger size living at the same time). *Palæotherium* and *Paloplotherium* of the Upper Eocene of Europe form a side branch. They were very abundant in Europe, but have not been found in the New World. On each foot they had three toes of nearly equal size, and the teeth show a rather peculiar pattern. One of these animals was thought by Prof. Huxley to be a direct ancestor of the horse, but it now is considered to be merely a collateral relative. Some species of *Palæotherium* were of large size, equal to a tapir. They were first described in the year 1804 by the celebrated Baron Cuvier from remains found in the gypsum quarries of Montmartre, Paris.

6. *Mesohippus*. Oligocene (White River Formation). In this stage there are three toes on each foot, a splint representing the fifth digit of the forefoot of the Eocene ancestors. The middle toe is now much larger than the side toes, which bear very little of the weight of the animal. Three of the premolars have now become entirely like the molar teeth, the crests on

the crown are completely formed, and the outside crest in the upper molars has taken the shape of two crescents. In the Middle Oligocene is found *Mesohippus bairdi* about the size of a coyote, while in the Upper Oligocene occurs *Mesohippus intermedius* as large as a sheep. Of both these animals all parts of the skeleton are known.

7. *Anchitherium* (Lower Miocene).—This stage has been found both in Europe and in America. It is much like its predecessor, but is larger and has the crests of the teeth somewhat higher and more complete. It probably is not in the direct line of descent of the horses, but is on a side branch.

8. *Parahippus* and *Hypohippus* (Middle Miocene).—In *Parahippus* the tooth-crests are much higher, and the transverse ridges on the upper molars are beginning to change shape so as to become a second pair of crescents inside the outer pair. *Hypohippus* is off the direct line of descent; its teeth are like those of *Anchitherium*, by which name it has been generally called, but the animal was much larger, equaling a Shetland pony in size. A complete skeleton of the *Hypohippus* was found near Pawnee Buttes, Colorado, in 1901 by Barnum Brown, of the Whitney expedition. In the forefoot of *Hypohippus* small rudiments still remain representing the first and fifth digits, but there is no splint of the fifth, as in *Mesohippus*. The second and fourth digits still touch the ground, though lightly. The feet of *Parahippus* were much like those of *Hypohippus*, but the side toes were smaller.

9 and 10. *Protohippus* and *Pliohippus* (Middle and Upper Miocene).—In this stage the crowns of the upper molars have become much longer, the two pairs of crescents on the upper molars are complete, with two half-separated cusps within the inner pair. And the valleys between the crests have become filled with cement, so that with the wear of the teeth the edges of hard enamel are backed inside by dentine and outside by cement. In this way the surface of the tooth has a series of enamel ridges always projecting a little above the grinding surface, because the softer material on each side wears down into hollows, yet never breaking off, because they are braced so thoroughly on each side. This is a very efficient instrument for grinding hard grasses. In *Protohippus* and *Pliohippus*, especially in the former, the crowns of the teeth are by no means as long as in the modern horses; they must therefore wear more slowly or wear out at an earlier age. The feet in these two genera have but one toe touching the ground. The side toes (second and fourth digits) are complete, but much more slender than in the earlier stages, and are apparently useless, as they cannot reach the ground. In some species of *Pliohippus* they have almost disappeared. The forefoot of *Protohippus* still retains tiny nodules of bone at the back of the "wrist" (sometimes improperly called in the horse the "knee-joint"), which are the remains of the first and fifth digits.

11. *Hipparion* (Pliocene).—This genus, probably also a side branch of the genealogical tree of the horse family, is much like *Protohippus*, but larger and with more complication about the tooth pattern. It is common in the

European Pliocene beds and has been found in America also. The feet are still three-toed, the side toes as large as those of the older *Protohippus*.

12. *Equus* (*Pleistocene* and *Recent*).—In this stage, that of the modern horse, the side toes have entirely disappeared and are represented by splints on the fore- and hindfoot. No trace remains on the forefoot of the little nodules which in *Protohippus* represented the first and fifth digits. The crowns of the teeth are much longer than in the last stage, and of the two half-separated inner columns on the upper molars, one has disappeared, the other has increased in size and changed in form. The skull has lengthened and the animal is much larger.

13. *Hippidium* (*Pleistocene*, *South America*).—The feet are like those of *Equus*, except that they were short and stout. The teeth are like those of *Protohippus*, from which it is supposed to be descended. The skull is large and long, with very long slender nasal bones. Casts of the skull and limbs presented by the Museo Nacional de Buenos Ayres, Argentine Republic, are exhibited here.

The Change in Feet and Teeth.—Along with the disappearance of the side toes in the evolution of the horse there is a considerable increase in the proportionate length of the limbs, and especially of the lower part of the leg and foot. The surfaces of the joints, at first more or less of the ball-and-socket kind, which allows free motion of the limbs in all directions, become keeled and grooved like a pulley-wheel, permitting free motion forward and backward, but limiting the motion in all other directions and increasing considerably the strength of the joint. By this means the foot is made more efficient for locomotion over a smooth regular surface, but less so for traveling over very rough ground, and it becomes of little use for striking or grasping or the varied purposes for which the feet of polydactyl animals are used.

The increased length in the lower leg and foot increases the length of the stride without decreasing its quickness. The heavy muscles of the leg are chiefly in the upper part, and to increase the length of the lower part changes the centre of gravity of the limb very little. Consequently the leg swings to and fro from the socket nearly as fast as before, since in an ordinary step the action of the leg is like that of a pendulum, and the speed of the swing is regulated by the distance of the centre of gravity from the point of attachment, as that of a pendulum is by the height of the bob. To increase the length of lower leg and foot therefore gives the animal greater speed; but it puts an increased strain on the ankles and toe-joints, and these must be strengthened correspondingly by converting them from ball-and-socket joints to "ginglymoid" or pulley joints. Additional strength, likewise at the expense of flexibility, is obtained by the consolidation of the two bones of the fore-arm (*ulna* and *radius*) and of the leg (*tibia* and *fibula*) into one, the shaft of the smaller bone practically disappearing, while its ends become fused solidly to its larger neighbor.

The increase in length of limb renders it necessary for the grazing animal that the head and neck should increase in length in order to enable the mouth to reach the ground. An ex-

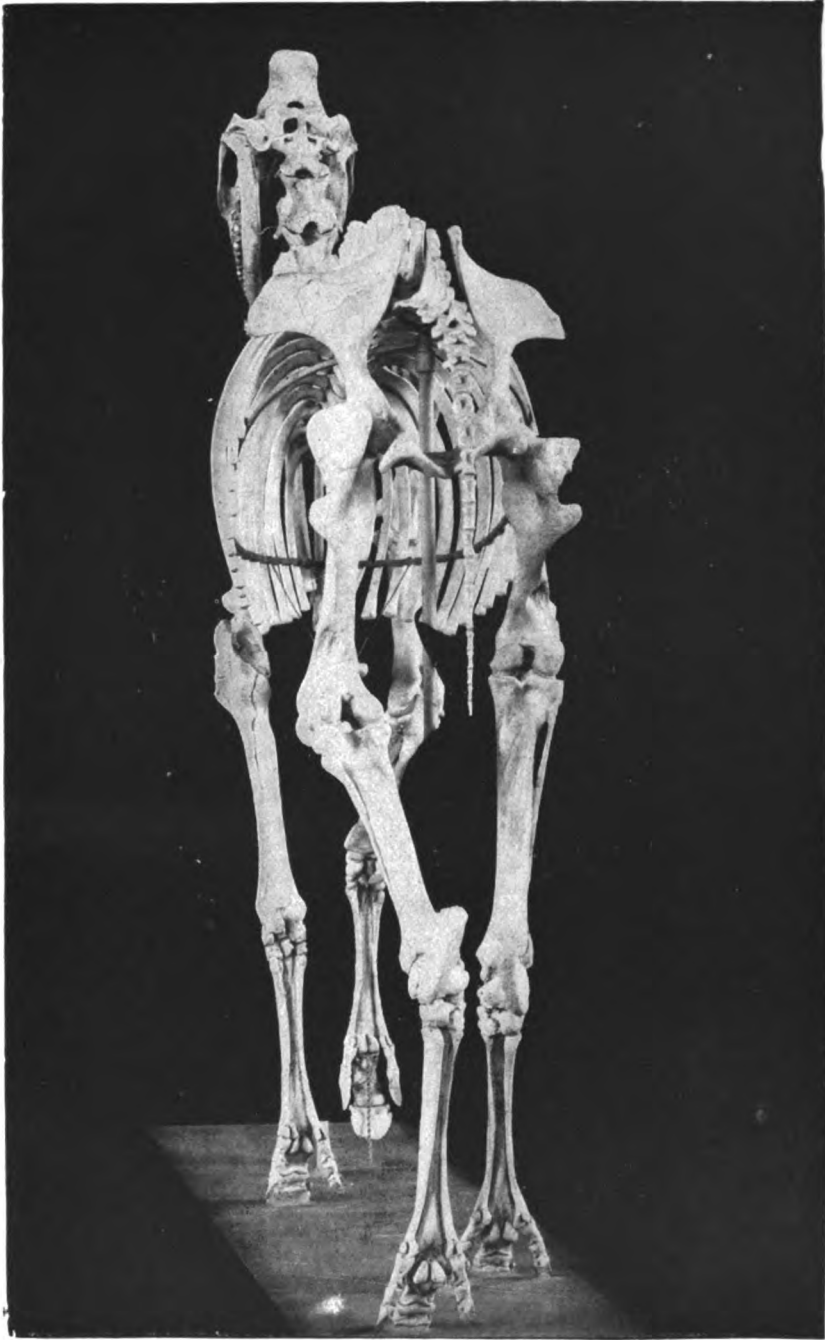
ample of these changes is the modern horse, in which we find the neck and head much elongated when compared with the little *Hyacotherium*, and this elongation has taken place *pari passu* with the elongation of the legs. The reduction and disappearance of the side toes and the concentration of the step on the single central toe serve likewise to increase the speed over smooth ground. The soft yielding surface of the polydactyl foot is able to accommodate itself to a rough irregular surface, but on smooth ground the yielding step entails a certain loss of speed. A somewhat similar case is seen in the pneumatic tire of a bicycle; a "soft" tire accommodates itself to a rough road and makes easier riding, but a "hard" tire is faster, especially on a smooth road. Similarly, the hard, firm step from the single toe allows of more speed over a smooth surface, although it compels the animal to pick its way slowly and with care on rough, irregular ground.

The change in the character of the teeth from "brachydont" or short-crowned to "hypsodont" or long-crowned enables the animal to subsist on the hard, comparatively innutritious grasses of the dry plains, which require much more thorough mastication before they can be of any use as food than do the softer green foods of the swamps and forests.

All these changes in the evolution of the horse are adaptations to a life in a region of the level, smooth and open grassy plains which are now its natural habitat. At first the race was better fitted for a forest life, but it has become more and more completely adapted to live and compete with its enemies or rivals under the conditions which prevail in the high dry plains of the interior of the great continents. The great increase in size, which has occurred in almost all races of animals whose evolution we can trace, is dependent on abundance of food. A large animal, as may be shown on ordinary principles of mechanics, requires more food in proportion to its size than does a small one, in order to keep up a proper amount of activity. On the other hand a large animal is better able than a small one to defend itself against its enemies and rivals. Consequently, as long as food is abundant, the larger animals have the advantage over their smaller brethren, and by the laws of natural selection the race tends to become continually larger until a limit is reached when sufficient food becomes difficult to obtain, the animal being compelled to devote nearly all its time to getting enough to eat.

Cause of the Evolution.—The evolution of the horse, adapting it to live on the dry plains, probably went hand in hand with the evolution of the plains themselves. At the commencement of the Age of Mammals the western part of the North American continent was by no means as high above sea-level as now. Great parts of it had but recently emerged, and the Gulf of Mexico still stretched far up the valley of the Mississippi. The climate at that time was probably very moist, warm and tropical, as is shown by the tropical forest trees, found fossil even as far as Greenland. Such a climate, with the low elevation of the land, would favor the growth of dense forests all over the country, and to such conditions of life the animals of the beginning of the Mammalian period must have been adapted. During the Tertiary the continent was steadily rising above the ocean-level, and at the

HYPOHIPPIUS.



Courtesy of the Philadelphia Commercial Museum.

**SKELETON FROM MIDDLE MIOCENE BEDS, NEAR PAWNEE,
BUTTE, COLORADO.**

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same time other influences were at work to make the climate continually colder and drier. The coming on of a cold, dry climate restricted and thinned the forests and caused the appearance and extension of open, grassy plains. The ancient forest inhabitants were forced either to retreat and disappear with the forests, or to adapt themselves to the new conditions of life. The ancestors of the horse, following the latter course, changed with the changing conditions, and the race became finally as we see it to-day, one of the most highly specialized of animals in its adaptation to its peculiar environment. At the end of the Age of Mammals the continents stood at a higher elevation than at present, and there was a broad land connection between Asia and North America, as well as those now existing. At this time the horse became cosmopolitan, and inhabited the plains of all the great continents, excepting Australia.

It is a question whether the direct ancestry of the modern horse is to be searched for in western America or in the little known interior plains of eastern Asia. It is also unknown why the various species which inhabited North and South America and Europe during the early part of the Age of Man should have become extinct, while those of Asia (horse and wild ass) and of Africa (wild ass and zebra) still survive. Man, since his appearance, has played an important part in the extermination of the larger animals; but there is nothing to show how far he is responsible for the disappearance of the native American species of horse.

Parallel Evolution in Other Races.—It is interesting to observe that while the evolution of the horse was progressing during the Tertiary Period in North America another group of hoofed animals, the *Litopterna*, now extinct, in South America evolved a race adapted to the broad plains of Argentina and Patagonia and singularly like the horse in many ways. These animals likewise lost the lateral toes one after another, and concentrated the step on the central toe; they also changed the form of the joint-surfaces from ball-and-socket to pulley-wheel joints; they also lengthened the limbs and the neck; and they also lengthened the teeth, and complicated their pattern. Unlike the true horse, they did not form cement on the tooth, so that it was by no means so efficient a grinder. This group of animals native to South America became totally extinct, and were succeeded by the horses, immigrants from North America, which in their turn became extinct before the appearance of civilized man.

Many of the contemporaries of the horse in the northern hemisphere were likewise lengthening the limbs, lightening and strengthening the feet, elongating the tooth-crowns to adapt themselves to the changing conditions around them, but none paralleled the horse evolution quite so closely as did the pseudo-horses of South America. But the camels in America, the deer, antelope, sheep and cattle in the Old World, progressed on much the same lines of evolution, although their adaptation was not to just the same conditions of life.

WILLIAM D. MATTHEW,
American Museum of Natural History.

Horse, the French Coach. The prevailing characteristic of a Frenchman is his devotion to those things that make life pleasant.

From an artistic standpoint he leads the world. Pleasure and horses go together. A Frenchman is instinctively a horseman. The French cavalry is without an equal in the world. Since the time of Napoleon the French government has taken charge of the breeding of horses that are best adapted for cavalry uses, and in accomplishing this purpose the government has contributed to the production of a very high-class coach horse. The cavalry horse of France is usually selected after the committee has finished their work of picking out the very best stallions for breeding purposes. Nearly every French coach stallion that stands for public service in France is owned by the French government. The French have been willing to advertise and sell their other breeds of horses, but they have been loath to part with their coach horses. The instinct of self-preservation causes the French government and the French people to keep their French coach horses at home in order to have better horses than can be found in any other country.

The breed of French coach horses has its origin from the same source as the English thoroughbred. On the one hand, the English thoroughbred surpasses in speed, while the French coach horse is superior in all of those qualities that go to make up a high-class carriage horse. Like the Percheron, the French coacher is developed in its highest state of perfection in Normandy, but he comes from the northern part, while the Perche is in the south of Normandy.

The French coach horse is about 16 hands high; his average weight is between 1,200 and 1,300 pounds. His color is as a rule bay, brown or chestnut. His outline is most pleasing. He is a fast trotter, and under the conditions of horse racing in France under saddle over a turf track a distance of 4,000 metres he holds the record. The French method of developing their trotters cultivates a very high, attractive style of action. Not only is the French coacher seen in every French city hauling the most gorgeous equipages over the boulevards surrounding Paris, but he is to be seen in the best stables throughout all of the capitals of Europe, especially in London.

The French coacher supplies the English royalty with their most useful and most attractive carriage horses.

For more than 20 years French coach stallions have been brought to America very sparingly. Where they have been crossed with the best road mares, trotting bred mares, the result has been most satisfactory. High-grade carriage horses that go into our best markets and sell for the highest prices usually have a strain of French coach blood flowing through their veins.

A perfect type of the French coach horse when standing or in action is impossible to describe in words. To fully realize his superiority, to appreciate and admire his style and magnificent high action, one must actually see him. Words are inadequate to describe him, and the most perfect picture falls far short of the most perfect horse.

JOHN R. McLAUGHLIN.

Horse, the Percheron. The Percheron horse is the production of the most patient care and the application of the best scientific principles of breeding. From the dawn of his

HORSE BOT-FLY — HORSE-CHESTNUT

For the French breeders of draft horses have been most successful, and the horses they have raised have been renowned the world over.

In the 16th, 17th and 18th centuries the same rules of selection in breeding have been applied that prevail to-day. The good horses were permitted to reproduce themselves and multiply. The inferior and unsound ones were never permitted to breed. The result of this most careful selection, based on scientific principles, has given the French the best draft horse that the world produces.

In a very small portion of Normandy called the "Perche" the highest result has been attained. From this district the Percheron horse has been sent to all parts of the world with such satisfactory results that the word Percheron to-day means the ideal draft horse the world over. From the very beginning up until the present time the object of the Percheron breeders has been to produce the kind of horse that would move the greatest weight with the greatest speed.

In making their selections for breeding purposes the Frenchmen have not only picked out stallions and mares that would make the best horses, but comely appearance and pleasing outline have also in a measure been their guide; and as a result the Percheron horse to-day is not only the best draft horse in the world, but he is one of the most attractive. He is indeed a handsome horse. The prevailing color of the Percheron horse is from black to white, including all of the various gradations from black, dark gray, dappled gray, gray and white.

About 50 years ago the first Percheron stallions were imported from France to America, and those that became most famous came to Ohio. One, called Louis Napoleon, owned in Union County, Ohio, and afterwards sold to go to Normal, Ill., both here in Ohio and in his new home in Illinois, was admired by all. In a few years, when his colts began to appear, the reputation of the Percheron breed in America was so well established that hundreds and even thousands of them have been imported to America each year.

During the past hundred years the government in France has maintained a system of supervision over the horse-breeding industry. The government does not own every Percheron stallion, but every Percheron stallion must be approved by the government inspectors and must receive a certificate of approval before he can be used for breeding purposes in France. Many of the best stallions belong to the government. Many of those owned by private individuals receive a subsidy from the government if their owner will offer their services to the public.

On account of the very high tariff laws the French breeders supply nearly all of the horses used in France. The ups and downs of prosperity and depression do not affect the horse-breeding industry in that country. During the period of depression that prevailed in the United States ten years ago American breeders became very much discouraged. Most of the stallions were castrated and the best mares were disposed of, but in France these conditions did not prevail.

In '97, '98 and '99, when more prosperous conditions were brought about in this country,

the demand for horses was very greatly increased. The French were able to supply the deficiency. Good stallions and mares could be found there in abundance when a surplus could not be found anywhere else in the world. Instinctively the French breeders keep their best stallions and mares, no matter what the foreign demand may be, and as long as they pursue this policy the best Percheron horses will be found in France and the best breed of draft horses in the world will be the Percheron.

JOHN R. McLAUGHLIN.

Horse Bot-fly, a bot-fly (*Gastrophilus equi*) parasitic in horses. The adult is about .75 inch long; the wings transparent with dark spots forming an irregular band toward the centre; the body brown and very hairy, the head whitish in front, and the abdomen dark-spotted. The females (males are rarely seen) have an elongated tapering abdomen. The oblong light yellow eggs are glued, one by one, to the hairs of the forepart of the body, where they are likely to be licked off by the animal. The moisture of the tongue causes the developed larvæ to break through the shell almost instantly, and to be carried into the mouth and thence to the stomach. Many curious facts have been observed in connection with these eggs and their development, and may be found fully discussed by Osborn in his 'Insects Affecting Domestic Animals,' issued by the United States Department of Agriculture (1896). Reaching the stomach, the larvæ fasten themselves to its walls by hooks in the posterior end of the body, and great masses sometimes accumulate, seriously obstructing the pyloric outlet. They remain there, absorbing nourishment and interfering with digestion through the winter, and on the return of warm weather let go their hold, pass out through the intestines, enter the ground, pupate there for a few days, and then emerge as flies. This pest chiefly affects horses out at pasture, and can be prevented only by removing the eggs, which can easily be seen. The attempt to remove the bots from the stomach by turpentine or other drugs is a dangerous proceeding which should only be attempted under direction of a veterinarian.

Horse-chestnut, or Buckeye, a tree of the small family *Hippocastanaceæ* and genus *Æsculus*, represented in Europe by the horse-chestnut (*Æ. hippocastanum*), now cultivated in all parts of the world, but native to Greece, Turkey, and southwestern Asia; and three indigenous American species known as buckeyes, from the appearance of the fruit. These trees are shapely, have leaflets diverging from the stalk like fingers, and bear white or tinted flowers in large erect panicles, turning the whole tree into the semblance of a big bouquet. The fruit of the horse-chestnut much resembles a huge chestnut, and is prickly when young. In this respect the common or Ohio buckeye (*Æ. glabra*) agrees with it, but has only five leaflets in each leaf and its flowers are small and not showy. The unpleasant odor exhaled by the bark and leaves in all this genus is especially strong in this species. A more southern species, developed into fine trees in the southern Alleghanies, is the sweet or yellow buckeye (*Æ. octandra*) which with the red buckeye (*Æ. peltata*) bears smooth fruit. Though so hand-

HORSEFIELD — HORSE-POWER

some, rapid in growth and serviceable as ornamental or shade trees, they are otherwise of little value. The wood is light colored, soft, and useful mainly for paper pulp and small articles; it contains a large quantity of saponaceous material, so that country people use the mucilaginous sap as soap. The leaves and roots of the Ohio buckeye are poisonous. The seeds are bitter but are eaten by cattle and sheep, with the preparation of boiling in alkaline water which is necessary in Europe; and from them a flour is made especially adapted to bookbinders and shoemakers' paste, as, besides having great tenacity, it will not be attacked by insects. In France starch is produced from horse-chestnut seeds on a large scale. The seeds are also used in the southern United States to impart a flavor of age to raw whiskey. The red buckeye has been naturalized in Europe as a park tree. California has a species of its own, Japan another, and a third grows on the Himalaya Mountains.

Horsefield, Thomas, American naturalist and explorer: b. Bethlehem, Pa., 12 May 1773; d. London, England, 1866. He was graduated in medicine at the University of Pennsylvania, and served as "medical apprentice" in the Pennsylvania Hospital from 1794-99, being the fifth interne in the hospital in the order of appointment. In October 1799 he accepted service as surgeon on the "China" about to sail for Java. He returned in the latter part of 1800, but in 1801 went again to Java for the purpose of thoroughly exploring the island, and was commissioned as regimental surgeon by the Dutch Colonial Government. From 1802 he devoted himself to the thorough examination of the flora, fauna, and geology of the island, at first under the auspices of the Dutch government, and, when possession of Java was taken by the English, under the especial patronage of Sir Thomas Stamford Raffles, the lieutenant-governor. A warm friendship, due to kindred tastes, sprang up between Horsefield and his celebrated patron, and, when the English tenure of Java ceased and Sir Stamford Raffles returned to England, Horsefield accompanied him, bringing with him the collections he had made, which were placed in the museum of the East India Company in London, of which he was presently made the curator, a position which he held for nearly fifty years until his death. Horsefield, by his explorations and writings, laid foundations for our knowledge of the natural history of the far East. He contributed while in Java many important papers to the publications of the Batavian Society of Arts and Sciences. In 1824 he gave to the world his great work entitled 'Zoological Researches in Java and the Neighboring Islands,' and from 1838-52 issued in folio parts the 'Plantæ Javanicæ Rariores.' Both works are sumptuously illustrated by colored plates. In 1856-58 he published the 'Catalogue of the Birds in the Museum of the East India Company,' and in 1857-59, with Frederic Moore, the 'Catalogue of the Lepidopterous Insects in the Museum of the East India Company.' Besides these larger works he was the author of a multitude of papers published in the 'Transactions' and 'Proceedings' of societies.

To him perhaps more than to any other single naturalist are we indebted for the first correct account of the botany and zoology of the regions with which he became familiar in his early life.

W. J. HOLLAND,

Director Carnegie Museum, Pittsburg.

Horse-fly, Gad-fly, or Deer-fly, any species of the family *Tabanidæ*, usually large robust, flies, with a broad head pointed in front and concave behind, with immense eyes, and fitting closely to the thorax. The legs are long and stout; sometimes hairy, but without stiff bristles. The females are provided with a long sharp proboscis with which they pierce the skin of animals, and are especially annoying to such short-haired kinds as horses and deer. No poison is injected into the wound, but injurious bacilli may be introduced, causing bad sores. One of the most widely distributed in the United States is the large black *Tabanus americanus*. These flies attach their eggs to grass and sticks in wet places. The larvæ find their way into water or wet earth, and are carnivorous, feeding on other insects, snails, etc. They pass the winter before pupating and emerge as flies in the early summer. To the same family belong many smaller green or yellow species of the woods more usually called deer-flies.

Horse-mackerel. The horse-mackerel, tuna, or tunny (*Thunnus thynnus*), is the largest member of the mackerel family (*Scombridae*), attaining a length of 10 feet or more and a weight of 1,000 to 1,500 pounds. It is found in all warm seas, both of the Atlantic and Pacific oceans, and wanders as far north as Newfoundland, appearing on our shores with the menhaden and mackerel. See TUNNY.

Horse-power, the power of an ordinary horse or its equivalent, the force with which a horse acts when drawing. The mode of ascertaining a horse's power is to find what weight he can raise and to what height in a given time, the horse being supposed to pull horizontally. From a variety of experiments it is found that a horse, at an average, can raise 160 pounds weight at a velocity of $2\frac{1}{2}$ miles per hour. The power of a horse exerted in this way is made the standard for estimating the power of a steam-engine. Thus we speak of an engine of 60 or 80 horse-power, each horse-power being estimated as equivalent to 33,000 pounds raised one foot high per minute, but this estimate is considered much too high, 17,400 foot-pounds per minute being generally considered nearer the truth. As it matters little, however, what standard be assumed, provided it be uniformly used, that of Watt has been generally adopted. The general rule for estimating the power of a steam-engine in terms of this unit is to multiply together the pressure in pounds on a square inch of the piston, the area of the piston in inches, the length of the stroke in feet, and the number of strokes per minute, the result divided by 33,000 will give the horse-power deducting one tenth for friction. As a horse can exert its full force only for about six hours a day, one-horse-power of machinery is equal to that of 4.4 horses.

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